United States
Department of
Agriculture

Soil
Conservation
Service

In cooperation with
United States Department
of the Interior, Bureau
of Land Management, and
University of Nevada
Agricultural Experiment
Station

Soil Survey of Las Vegas Valley Area Nevada

Part of Clark County

How To Use This Soil Survey

General Soil Map

The general soil map, which is the color map preceding the detailed soil maps, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

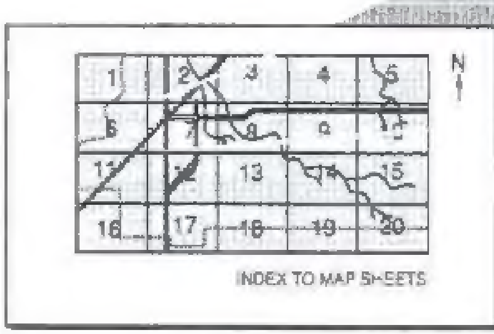
To find information about your area of interest, locate that area on the map, identify the name of the map unit in the area on the color-coded map legend, then refer to the section **General Soil Map Units** for a general description of the soils in your area.

Detailed Soil Maps

The detailed soil maps follow the general soil map. These maps can be useful in planning the use and management of small areas.

MAP SHEET

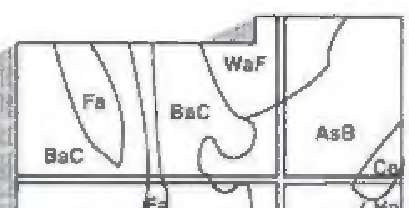
To find information about your area of interest, locate that area on the **Index to Map Sheets**, which precedes the soil maps. Note the number of the map sheet, and turn to that sheet.



INDEX TO MAP SHEETS

Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Turn to the **Index to Map Units** (see Contents), which lists the map units by symbol and name and shows the page where each map unit is described.

MAP SHEET



AREA OF INTEREST

NOTE: Map unit symbols in a soil survey may consist only of numbers or letters, or they may be a combination of numbers and letters.

The **Summary of Tables** shows which table has data on a specific land use for each detailed soil map unit. See **Contents** for sections of this publication that may address your specific needs.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other federal agencies, state agencies including the Agricultural Experiment Stations, and local agencies. The Soil Conservation Service has leadership for the federal part of the National Cooperative Soil Survey. In line with Department of Agriculture policies, benefits of this program are available to all, regardless of race, color, national origin, sex, religion, marital status, or age.

Major fieldwork for this soil survey was completed in 1981. Soil names and descriptions were approved in 1982. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1982. This survey was made cooperatively by the Soil Conservation Service, the Bureau of Land Management, and the University of Nevada Agricultural Experiment Station. It is part of the technical assistance furnished to the Clark County Conservation District.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

Cover: An area of Destazo soils in the Las Vegas-Destazo complex, 0 to 2 percent slopes, at the lower edge of the fan piedmont northeast of Las Vegas.

Contents

Soil Series

Issued July 1985

Index to Map Units

Summary of Tables

Foreword

This soil survey contains information that can be used in land-planning programs in Las Vegas Valley Area, Nevada, Part of Clark County. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to insure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Soil Conservation Service or the Cooperative Extension Service.

Gerald Thola

Gerald C. Thola
State Conservationist
Soil Conservation Service

Location of Las Vegas Valley Area, Part of Clark County, in Nevada.

Soil Survey of
Las Vegas Valley Area, Nevada Part of Clark County

By Robert L. Speck, Soil Conservation Service

Fieldwork by Robert L. Speck and Thomas R. McKay
Soil Conservation Service

United States Department of Agriculture, Soil Conservation Service
In cooperation with
United States Department of the Interior,
Bureau of Land Management, and
University of Nevada
Agricultural Experiment Station

LAS VEGAS VALLEY AREA, Part of Clark County, is in the southern part of Nevada. It has a total area of 473,391 acres, or about 740 square miles. Las Vegas, North Las Vegas, Henderson, and Boulder City are the principal cities in the survey area.

The survey area is bounded on the northeast by the Nellis Air Force Base Ground Gunnery Range, on the west by the Spring Mountains, on the south by the McCullough Mountains, and on the east by the River Mountains and Frenchman Mountain.

Slightly more than half of the survey area is privately or municipally owned. Federal agencies including the Bureau of Land Management, Department of Defense, and Bureau of Reclamation administer most of the rest of the area.

Two older surveys, "Soil Survey of Las Vegas Area" and "Soil Survey of Las Vegas and Eldorado Valleys Area," (*11, 14*) were published in 1923 and 1967, respectively. These earlier surveys cover a part of the present survey. The present survey, however, updates the earlier surveys and provides additional information and larger maps that show the soils in greater detail.

Descriptions, names, and delineations of soils in this soil survey do not fully agree with those on soil maps for adjacent survey areas. Differences are the result of better knowledge of soils, modifications in series concepts, intensity of mapping, or the extent of soils within the survey.

General Nature of the Survey Area

This section gives general information about the survey area. It briefly discusses history; water supply; industry, transportation, and recreation; agriculture, physiography and geology, and climate.

History

Relics and other evidence of primitive campsites indicate that the large springs in Las Vegas Valley were used as watering places long before the arrival of the white man.

Spanish padres who explored this region about 1700 called the valley "Las Vegas," meaning "The Meadows." Wild grasses grew abundantly where the water supply was plentiful. Later visits were made by trappers, traders, and explorers, including Kit Carson and General John Fremont. The Fremont party camped in Las Vegas in 1844.

By 1855 the existence of water in Las Vegas Valley was well known, and Brigham Young assigned a party of 30 Mormon missionaries to colonize and develop the

valley. An adobe fort and dwellings were built near the springs, the soil was tilled, and crops were grown to provide food for the settlers. In 1857 the Las Vegas mission was abandoned. After that, further use of ground water for agricultural purposes was made by the Stewart and Kyle ranches.

The State Land Act of 1885 offered tracts of 640 acres at low cost. Farming subsequently took on a permanent aspect. Small orchards were planted, and alfalfa was grown on some of the better soils. After the discovery of artesian water in 1906, alfalfa became the major crop.

The population of the city of Las Vegas, according to the 1910 census, was 800, and probably a total of 1,000 people resided in Las Vegas Valley. By 1920 the population of the city had risen to 2,300 and that of the valley to 2,500. The population increased steadily after 1930, as a result of a growing tourist trade and the construction of Hoover Dam. According to the 1980 census, the population of the city of Las Vegas was 164,674 and that of Las Vegas Valley, including Boulder City, was more than 293,000.

Water Supply

Water used in Las Vegas Valley is obtained from wells and from Lake Mead. The supply is managed by the State of Nevada, Division of Colorado River Resources, which oversees the operation of the Southern Nevada Water System. The Las Vegas Valley Water District distributes water to major parts of Las Vegas and other unincorporated areas in the valley. The city of North Las Vegas provides water to a large part of the unincorporated area of Clark County, as well as to their own city, and to a small part of the city of Las Vegas. Henderson and Boulder City individually maintain their own water distribution systems.

In 1965, Congress authorized the development of the Southern Nevada Water System Project to assure an adequate supply of water for southern Nevada. By action of the Nevada Legislature in 1971 and 1975, the Las Vegas Water District was given the responsibility of operating, maintaining, and administering the facilities of the Southern Nevada Water System Project, which is jointly owned by the state of Nevada and the U.S. Government.

The principal source of water is Lake Mead. The State of Nevada has been allocated 300,000 acre-feet annually of Lake Mead water, an allotment confirmed by the Supreme Court in a 1964 decree. The first stage of the Southern Nevada Water System entails making 132,200 acre-feet of this water available to Las Vegas Valley; the rest of the water will become available as a result of stage two.

Supplementing the Southern Nevada Water System facilities is the supply from the Las Vegas Valley Water District wells. There are thirty operating wells, located primarily in the western part of Las Vegas, which have a combined output of approximately 92 million gallons per day. The Water District has a total appropriation of 40,000 acre-feet per year of ground water from the State of Nevada.

Prior to 1970, Las Vegas area residents depended primarily on the aquifer underlying the Las Vegas Valley to supply their needs for water. As the population increased dramatically during the 1950's, more and more water was pumped to meet the needs of this expanding population. Since 1945 the ground water withdrawal rate has exceeded the estimated annual recharge rate. This continuing overdraft of ground water has resulted in a general lowering of the ground water level, with consequent subsidence in some areas.

All of the water in the area is fairly hard. The well water contains about 240 milligrams of dissolved solids per liter, or 14 grains per gallon, and the Lake Mead water contains 750 milligrams per liter, or 40 grains per gallon. The total mineral content of the Lake Mead water is somewhat higher than is desirable, but the water is still safe for domestic use.

Industry, Transportation, and Recreation

The main industries in the survey area are services related to gaming and tourism and to the wholesale and retail trades. Nearly half of the jobs in the area are service oriented, and hotels, gaming, and recreation provide more than two-thirds of those. Trade accounts for about one-fifth of the local jobs.

The area is served by the Union Pacific Railroad, and Las Vegas is the principal terminal for east-west shipment of cargo. Limited passenger service between Los Angeles and Salt Lake City via Las Vegas is provided by Amtrak. The principal highways serving the area are Interstate 15 and U.S. 95, both running roughly from north to south. Numerous local roads and streets provide ready access to the survey area.

Five airports are in the survey area. McCarran International, the largest of these, brings over 40 percent of the visitors to the area.

The largest recreational attraction is nearby Lake Mead National Recreation Area, which drew over 6.9 million visitors in 1978. Also close by is the Toiyabe National Forest, which was visited by 2 million people in 1979.

Agriculture

Because of flooding, high concentrations of salt in the ground water used for irrigation, and urban development pressure, only about 350 acres are still cultivated in Las Vegas Valley. Most of this acreage is in alfalfa. If present trends continue, this acreage will soon give way to urban development and agricultural activity in the valley will cease.

Physiography and Geology

The Las Vegas Valley Area lies in the southwestern part of the Great Basin, within the Basin and Range physiographic province. Surrounding the low-lying alluvium-filled valley are sharp, rugged mountain ranges. Between the mountains and the nearly level basin floor is a gently sloping alluvial fan piedmont.

Las Vegas Valley extents in a northwest-southeast direction and drains toward the south through the Las Vegas Wash into Lake Mead. On the west are the Spring Mountains, which consist mostly of well-consolidated sedimentary rock and are more than 7,500 feet above sea level. The highest point in this range—Charleston Peak—is at about 11,910 feet. On the north are the Pintwater, Desert, Sheep, and Las Vegas Mountains, which are not so steep as the Spring Mountains and run north to south. On the east is Frenchman Mountain. It rises to an elevation of 4,000 feet, but toward the south, near Las Vegas Wash, its ridge drops down to about 2,500 feet. On the south are the River Mountains and the McCullough Range.

The sedimentary formations in the mountain ranges consist mainly of limestone and mixtures of sandstone, shale, dolomite, gypsum, and, in some places, interbedded quartzite. These formations date from the Cambrian to the early Devonian periods of the early Paleozoic era to the Jurassic period of the Mesozoic era (*6*). Volcanic activity was confined to the formation bordering the southern and eastern parts of Las Vegas Valley. Eruptions that resulted in basalt, rhyolite, and latite flows occurred during three periods of the Cenozoic era.

The alluvial fan piedmont is composed of many coalescing fans dissected by numerous drainage channels. The upper boundary, the average elevation of which is about 4,500 feet, is clearly defined by an abrupt change in slope and by rock outcrop. The lower boundary, the average elevation of which is about 2,500 feet above sea level, is obscure, because the change in slope and in the characteristics of the material is gradual. In its upper reaches, the fan piedmont is made up of poorly sorted gravelly, cobbly, and stony sand deposits that grade to finer textured material near the valley floor. Deposition started during the later Tertiary and Quaternary periods of the Cenozoic era and is continuing today.

The basin floors are depositional areas of lake-laid silt and clay and younger alluvial deposits. Two periods of lake activity, one during the Miocene and one during the Pleistocene, influenced the valley-filling process. Subsequent faulting of some of the lakebeds has resulted in the lowland's dominant landform. This landform consists of a series of scarps that range in elevation from a few feet to 150 feet. Easily eroded silt and clay beds of the Muddy Creek Formation of Miocene age are exposed on the faces of the scarps. The younger alluvial deposits have been transported, mainly by water, and deposited on gently sloping basin floors and flood plains. Deposition of alluvium is continuing today. In places, intermittent streams are cutting into the flood plains and forming stream terraces. Prominent on the landscape are numerous scattered sand dunes of varying sizes, a result of recent wind activity.

Climate

Prepared by the National Climatic Center, Asheville, North Carolina.

In the Las Vegas Valley Area, summers are hot, especially at lower elevations, and winters are mild. Precipitation normally is light during all months of the year.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Las Vegas, Nevada, in the period 1951 to 1978. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter, the average temperature is 47 degrees F and the average daily minimum temperature is 35 degrees. The lowest temperature on record, which occurred at Las Vegas on January 13, 1963, is 8 degrees. In summer, the average temperature is 87 degrees and the average daily maximum temperature is 102 degrees. The highest recorded temperature, which occurred on July 14, 1972, is 116 degrees.

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (40 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

Of the total annual precipitation, 2 inches, or 50 percent, usually falls in April through September, which includes the growing season for most crops. In 2 years out of 10, the rainfall in April through September is less than 70 inches. The heaviest 1-day rainfall during the period of record was 2.58 inches at Las Vegas on August 21, 1957. Thunderstorms occur on about 15 days each year, and most occur in summer.

Snowfall is rare. In 75 percent of the winters, there is no measurable snowfall. In 15 percent, the snowfall, usually of short duration, is more than 2 inches. The heaviest 1-day snowfall on record was more than 8 inches.

The average relative humidity in midafternoon is about 20 percent. Humidity is higher at night, and the average at dawn is about 40 percent. The sun shines 90 percent of the time in summer and 80 percent in winter. The prevailing wind is from the southwest. Average windspeed is highest, 11 miles per hour, in spring.

How This Survey Was Made

This survey was made to provide information about the soils and miscellaneous areas in the survey area. The information includes a description of the soils and miscellaneous areas and their location and a discussion of their suitability, limitations, and management for specified uses. Soil scientists observed the steepness, length, and shape of the slopes, the general pattern of drainage, the kinds of crops and native plants, and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biologic activity.

The soils and miscellaneous areas in the survey area are in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind or segment of the landscape. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landscape, a soil scientist develops a concept or model of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with considerable accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Individual soils on the landscape commonly merge gradually onto one another as their characteristics gradually change. To construct an accurate map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted color, texture, size, and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While the soil survey was in progress, samples of some of the soils in the area were collected for laboratory analyses and for engineering tests. Soil scientists interpreted the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils were field tested through observation of the soils in different uses and under different levels of management. Some interpretations were modified to fit local conditions, and some new interpretations were developed to meet local needs. Data were assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management were assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can state with a fairly high degree of probability that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

General Soil Map Units

The general soil map at the back of this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each map unit on the general soil map is a unique natural landscape. Typically, a map unit consists of one or more major soils or miscellaneous areas and some minor soils or miscellaneous areas. It is named for the major soils or miscellaneous areas. The soils or miscellaneous areas making up one unit can occur in other units but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils or miscellaneous areas can be identified on the map. Likewise, areas that are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The soils in any one map unit differ from place to place in slope, depth, drainage, and other characteristics that affect management.

Map Unit Descriptions

1. Rock outcrop-St. Thomas-Akela

Rock outcrop, and shallow and very shallow soils; on hills and mountains

This map unit is mainly in the western and southern parts of the survey area, in low areas of the Spring Mountains and McCullough Range. A portion of it is in the eastern part of the area, in the River Mountains and on Frenchman Mountain. The vegetation is mainly creosotebush and white bursage.

This unit makes up about 15 percent of the survey area. The most extensive components are Rock outcrop and the St. Thomas and Akela soils.

Rock outcrop is on ridges. It is barren and consists of limestone, basalt, and andesite.

The St. Thomas soils are moderately steep, shallow and very shallow, and well drained. They are extremely cobbly and loamy throughout and are underlain by limestone.

The Akela soils are moderately steep and steep, shallow, and well drained. They have a very cobbly or very gravelly surface layer and are very gravelly and loamy below the surface layer. These soils are underlain by hard volcanic bedrock.

Of minor extent in this unit are Hobog and Canutio soils. Hobog soils are on rolling hills, and Canutio soils are on the foot slopes of rolling hills.

This unit is used mainly as habitat for desert wildlife. Some areas are used for urban development. If the unit is used for urban development, it is limited mainly by steepness of slope and shallowness to rock.

2. Cave-Las Vegas-Goodsprings

Shallow and very shallow soils, on alluvial remnants

This map unit is mainly in the western part of the survey area. The vegetation is mainly creosotebush and white bursage.

This unit makes up about 33 percent of the survey area. The most extensive soils in the unit are the Cave, Las Vegas, and Goodsprings soils.

The Cave soils are nearly level to strongly sloping, shallow and very shallow, and well drained. They have an extremely stony or very gravelly surface layer and are gravelly and loamy below the surface layer. These soils are underlain by an indurated, lime-cemented hardpan.

The Las Vegas soils are nearly level to gently sloping, shallow and very shallow, and well drained. They are loamy throughout and are underlain by an indurated, lime-cemented hardpan.

The Goodsprings soils are gently sloping, shallow and very shallow, and well drained. They are gravelly and loamy throughout and are underlain by an indurated, lime-cemented hardpan.

Of minor extent in this unit are Destazo, Skyhaven, and Tencee soils. Destazo and Skyhaven soils are on relict alluvial flats. Tencee soils are on fan remnants.

This unit is used mainly for urban development and as habitat for desert wildlife. The main limitation for urban development is the shallowness to the hardpan.

3. Jean-Arizo

Very deep soils; on recent alluvial fans

This map unit is mainly in the western and southern parts of the survey area. The vegetation is mainly creosotebush and white bursage.

This unit makes up about 14 percent of the survey area. The most extensive soils in the unit are the Jean and Arizo soils.

The Jean soils are nearly level to gently sloping, very deep, and excessively drained. They are sandy in the upper part and are very gravelly and sandy in the lower part. Most areas of these soils are subject to rare periods of flooding, and some areas are more frequently flooded.

The Arizo soils are nearly level to moderately sloping, very deep, and excessively drained. They are very gravelly and sandy throughout. These soils are subject to rare periods of flooding, and areas in channels are more frequently flooded.

This unit is used for urban development and as habitat for desert wildlife. The main limitations for urban development are flooding in some areas, the rapid permeability of the soils, and the content of small stones in the soils.

4. Bluepoint-Knob Hill

Very deep soils, on sand sheets

This map unit is in the southern part of the survey area, near Boulder City. The vegetation is mainly creosotebush and white bursage.

This unit makes up about 2 percent of the survey area. The most extensive soils in the unit are Bluepoint and Knob Hill soils.

The Bluepoint soils are nearly level to strongly sloping, very deep, and somewhat excessively drained. These soils are sandy throughout.

The Knob Hill soils are nearly level to moderately sloping, very deep, and somewhat excessively drained. These soils are gravelly and sandy throughout.

This unit is used mainly as habitat for desert wildlife. Some areas are used for urban development. If the unit is used for urban development, it is limited mainly by the rapid and moderately rapid permeability of the soils and by droughtiness.

5. Weiser-Dalian

Very deep soils, on fan remnants, fan skirts, and inset fans

This map unit is mainly in the northern part of the survey area. The vegetation is mainly creosotebush and white bursage.

This unit makes up about 14 percent of the survey area. The most extensive soils in the unit are the Weiser and Dalian soils.

The Weiser soils are gently sloping or moderately sloping, very deep, and well drained. These soils are extremely gravelly and loamy throughout.

The Dalian soils are nearly level to moderately sloping, very deep, and well drained. In most areas these soils are extremely gravelly or very gravelly and loamy throughout. In some areas the surface layer is very cobbly. Some areas of these soils are subject to rare periods of flooding.

Of minor extent in this unit are Canutio and Casaga soils. Canutio soils are on alluvial fans, and Casaga soils are on fan remnants.

This unit is used mainly as habitat for desert wildlife. Some areas are used for urban development. If the unit is used for urban development, the main limitations are the content of small stones in the soils and droughtiness.

6. Caliza-Aztec

Very deep soils, on fan terraces

This map unit is mainly in the eastern part of the survey area. The vegetation is mainly creosotebush and white bursage.

This unit makes up about 7 percent of the survey area. The most extensive soils in the unit are the Caliza and Aztec soils.

The Caliza soils are gently sloping or moderately sloping, very deep, and well drained. These soils are very gravelly or very cobbly and loamy in the upper part and are very gravelly and sandy in the lower part. They are subject to rare periods of flooding.

The Aztec soils are gently sloping to moderately steep, very deep, and well drained. These soils are stratified very gravelly and loamy material to extremely gravelly and sandy material. They are weakly cemented with lime and gypsum at varying depths.

Of minor extent in this unit are Bracken, Nickel, and Pittman soils. Bracken soils are on pediments, and Nickel and Pittman soils are on fan remnants.

This unit is used for urban development and as habitat for desert wildlife. If the unit is used for urban development, it is limited mainly by the hazard of flooding, the content of small stones in the soils, and droughtiness.

7. McCarran

Very deep soils, on basin floor remnants

This map unit is mainly in the central and eastern parts of the survey area. The vegetation is mainly creosotebush, white bursage, and desert holly.

This unit makes up about 7 percent of the survey area. The most extensive soils in the unit are the McCarran soils.

The McCarran soils are nearly level to moderately sloping, very deep, and well drained. They are loamy in the upper part and are gravelly and loamy in the lower part, and they contain gypsum throughout. They are subject to rare periods of flooding.

Of minor extent in this unit are Grapevine and McCullough soils, soils that have petrocalcic horizons, and Badland. Grapevine soils are on relict alluvial flats, and McCullough soils are on fan skirts. Badland is dissected barren land that has local relief ranging from 25 to 100 feet. The soils that have petrocalcic horizons

are associated with the Badland in the south-central part of the survey area

This unit is used for urban development and as habitat for desert wildlife If the unit is used for urban development, the main limitations are the hazard of flooding, the moderately slow permeability of the soils, and excess salts

8. Glencarb

Very deep soils, on flood plains and alluvial flats

This map unit is mainly in the northeastern part of the survey area. The vegetation is mainly creosotebush, white bursage, shadscale, and alkali sacaton

This unit makes up about 5 percent of the survey area. The most extensive soils in the unit are the Glencarb soils.

The Glencarb soils are nearly level, very deep, and well drained. These soils are silty throughout and are subject to rare periods of flooding

Of minor extent in this unit are Skyhaven and Casaga soils. The Skyhaven soils are on basin floor remnants, and the Casaga soils are on erosional fan remnants.

This unit is used for urban development and as habitat for desert wildlife. If the unit is used for urban development, the main limitations are the hazard of flooding and the moderately slow permeability of the soils.

9. Land-Spring

Very deep, salt-affected soils; on alluvial flats

This map unit is mainly in the east-central part of the survey area. The vegetation is mainly shadscale, saltbush, alkali sacaton, and inland saltgrass

This unit makes up about 3 percent of the survey area. The most extensive soils in the unit are the Land and Spring soils.

The Land soils are nearly level, very deep, and somewhat poorly drained. They are silty throughout. They have a high concentration of soluble salts in some part of the profile These soils are subject to rare periods of flooding

The Spring soils are nearly level, very deep, and moderately well drained. These soils are silty and have soluble salts and gypsum throughout. They are subject to rare periods of flooding

Of minor extent in this unit are Bluepoint, Glencarb, and Paradise soils The Bluepoint soils are on sand sheets on flood plains, the Glencarb soils are on flood plains, and the Paradise soils are adjacent to springs and seeps on recent alluvial flats.

This unit is mainly used for urban development and as habitat for desert wildlife. If the unit is used for urban development, the main limitations are the hazard of flooding, wetness, and excess salts.

Detailed Soil Map Units

The map units delineated on the detailed maps with this survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this section, along with the maps, can be used to determine the suitability and potential of a unit for specific uses. They also can be used to plan the management needed for those uses. More information on each map unit is given under "Use and Management of the Soils."

A map unit delineation on a map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils or miscellaneous areas. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils and miscellaneous areas are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some "included" areas that belong to other taxonomic classes.

Most included soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, inclusions. They may or may not be mentioned in the map unit description. Other included soils and miscellaneous areas, however, have properties and behavior divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, inclusions. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. The included areas of contrasting soils or miscellaneous areas are mentioned in the map unit descriptions. A few included areas may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of included areas in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into segments that have similar use and management requirements. The delineation of such landscape segments on the map provides sufficient information for the development of resource plans, but if intensive use of small areas is planned, onsite investigation to precisely define and locate the soils and miscellaneous areas is needed.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer or of the underlying layers, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the underlying layers. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Land silt loam, drained, is one of several phases in the Land series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Jean-Goodsprings complex, 2 to 4 percent slopes, is an example.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Slickens is an example.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary

defines many of the terms used in describing the soils or miscellaneous areas.

In the Las Vegas Valley Area, the mean annual temperature is about 66 degrees F, the mean annual precipitation is about 4 inches, and the frost-free season ranges from 220 to about 270 days. More detailed climatic data are available in the section "Climate" and in tables 1, 2, and 3. Because the climate is quite uniform throughout the survey area, climatic data are not given in the individual map unit descriptions.

Map Unit Descriptions

105—McCullough-Jean-Bluepoint complex, 0 to 4 percent slopes. This map unit is on fan piedmonts.

This unit is 40 percent McCullough fine sandy loam, 0 to 4 percent slopes, 30 percent Jean loamy fine sand, 0 to 4 percent slopes, and 20 percent Bluepoint loamy fine sand, 0 to 4 percent slopes. The McCullough soil is on fan skirts, the Jean soil is on inset fans crossing fan piedmonts, and the Bluepoint soil is on sand sheets on fan piedmonts. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are about 5 percent Las Vegas soils and 5 percent McCarran soils on relict alluvial flats. Included areas make up about 10 percent of the total acreage. The percentage varies from one area to another.

The McCullough soil is very deep and well drained. It formed in alluvium derived from various kinds of rock. Typically, the surface layer is pink fine sandy loam about 2 inches thick. The subsoil is light brown and pink gravelly sandy loam and fine sandy loam about 24 inches thick. The upper 9 inches of the substratum is pink, weakly lime-cemented, stratified fine sandy loam and loam, and the lower part to a depth of 62 inches is pink fine sand.

Permeability of the McCullough soil is moderate. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high. This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks.

The Jean soil is very deep and excessively drained. It formed in alluvium derived dominantly from limestone, sandstone, and quartzite. Typically, the surface layer is pink loamy fine sand about 1 inch thick. The upper 17 inches of the substratum is light reddish brown and pink loamy fine sand, and the lower part to a depth of 60 inches or more is pink, stratified very gravelly loamy fine sand to extremely gravelly sand.

Permeability of the Jean soil is rapid. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is very slow, and the hazard of water erosion is slight. The hazard of soil blowing is high. This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks.

The Bluepoint soil is very deep and somewhat excessively drained. It formed in eolian deposits derived dominantly from sandstone and quartzite. Typically, the surface layer is pink loamy fine sand 2 inches thick. The underlying material to a depth of 60 inches or more is pink fine sand or loamy fine sand.

Permeability of the Bluepoint soil is rapid. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is very slow, and the hazard of water erosion is slight. The hazard of soil blowing is high.

This unit is used mainly for urban development. It is also used as habitat for desert wildlife and for recreation.

The main limitation for construction of dwellings is the hazard of flooding on the McCullough and Jean soils. Dikes and channels that have outlets for floodwater can be used to protect buildings from flooding. Excavating in areas of the Jean and Bluepoint soils can expose material that is highly susceptible to soil blowing. Gypsum in the McCullough soil can induce electrochemical action that corrodes concrete. This limitation can be overcome by using cement that is resistant to sulfate corrosion.

The main limitation for septic tank absorption fields is the inadequate filtration of effluent in the Jean and Bluepoint soils. Because the substratum is rapidly permeable, special design may be needed to avoid polluting ground water and nearby water supplies. If the density of housing is moderate to high, community sewage systems are needed to prevent contamination of water supplies as a result of seepage from onsite sewage disposal systems.

Channeling and deposition can be minimized and maintenance costs reduced by protecting roads on the McCullough and Jean soils from flooding. The Bluepoint soil in this unit is flooded less frequently and is more suitable for use as sites for roads. When the Bluepoint soil is dry, roads are difficult to maintain because of the presence of loose sand. This results in poor traction and an increased risk of soil blowing.

The main limitation for lawns and landscaping is the very low available water capacity of the Jean soil. Frequent irrigation of lawns, gardens, and most other plantings is needed.

This map unit is in capability subclasses IVs, irrigated, and VIIs, nonirrigated. The McCullough soils are in horticultural group 2, and the Jean and Bluepoint soils are in horticultural group 3.

107—Arizo extremely stony loam, 0 to 4 percent slopes. This very deep, excessively drained soil is on inset fans. It formed in alluvium derived dominantly from basalt and andesite.

Typically, about 85 percent of the surface is covered with a desert pavement of stones, cobbles, and pebbles. A dark desert varnish is on the exposed surfaces of the rock fragments. The surface layer is pink extremely stony loam about 4 inches thick. The underlying material to a depth of 60 inches or more is pale brown, stratified material that averages very gravelly sand.

Included in this unit are about 5 percent Cave soils on erosional fan remnant shoulders and 5 percent Caliza soils on erosional fan remnant side slopes. Included areas make up about 10 percent of the total acreage.

Permeability of this Arizo soil is very rapid. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is moderate. This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks.

This unit is used mainly as habitat for desert wildlife and for recreation. It is also used for urban development.

The main limitations for construction of dwellings are the rare periods of flooding and the desert pavement. Dikes and channels that have outlets for floodwater can be used to protect buildings and onsite sewage disposal systems from flooding. The desert pavement interferes with the use of equipment.

The main limitations for septic tank absorption fields are inadequate filtration of effluent and the stones and cobbles in the soil. Because the substratum is highly permeable, special design may be needed to avoid polluting ground water and nearby water supplies. The presence of stones may hamper excavation.

This unit is limited for roads because of the desert pavement. Unless an adequate wearing surface is maintained, stones and cobbles in the soil create road hazards and increase maintenance costs.

The main limitations for lawns and landscaping are droughtiness, the content of pebbles throughout the soil and the content of stones and cobbles in the surface layer. Frequent irrigation of lawns, gardens, and most other plantings is needed because of the limited available water capacity of the soil. Topsoil is needed for best results when landscaping, particularly in areas used for lawns.

This map unit is in capability subclass VIIs, nonirrigated, and in horticultural group 3.

112—Arizo very gravelly loamy sand, flooded, 0 to 4 percent slopes. This very deep, excessively drained soil is in channels on fan piedmonts. It formed in alluvium derived dominantly from various kinds of rock.

Typically, 65 percent of the surface is covered with pebbles. The surface layer is pale brown very gravelly loamy sand about 2 inches thick. The underlying material to a depth of 60 inches or more is light brown, stratified very gravelly sandy loam to extremely gravelly loamy sand, averaging very gravelly loamy sand.

Included in this unit are about 5 percent Nickel soils on erosional fan remnants, 3 percent Aztec soils on nonburied fan remnants, 5 percent Cave soils on erosional fan remnants, and 2 percent McCarran soils on relict alluvial flats. Included areas make up about 15 percent of the total acreage.

Permeability of this Arizo soil is very rapid. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is very slow, and the hazard of water erosion is slight. The hazard of soil blowing is moderate. This soil is subject to occasional periods of very brief, high-velocity flooding from March through September.

Most areas of this unit are used as habitat for desert wildlife and for recreation. A few areas are used for urban development.

This unit is poorly suited to urban development. The main limitation for construction of dwellings is the hazard of flooding. Flooding can be controlled only by use of major flood control structures.

The main limitations for septic tank absorption fields are the hazard of flooding and inadequate filtration of effluent. Flooding can be controlled only by use of major flood control structures. Because the substratum is highly permeable, special design may be needed to avoid polluting ground water and nearby water supplies.

This unit is limited for roads because of the hazard of flooding. Flooding can be controlled only by use of major flood control structures.

The main limitations for lawns and landscaping are the content of cobbles and pebbles throughout the soil and the very low available water capacity. Topsoil is needed for best results when landscaping, particularly in areas used for lawns. Frequent irrigation of lawns, gardens, and most other plantings is needed because of the limited available water capacity of the soil.

This map unit is in capability subclasses IVw, irrigated, and VIIw, nonirrigated. It is in horticultural group 3.

113—Arizo very gravelly fine sandy loam, gypsiferous substratum, 2 to 8 percent slopes. This very deep, excessively drained soil is on inset fans on pediments underlain by weakly consolidated, gypsiferous sediment. It formed in alluvium derived dominantly from basalt and andesite overlying gypsiferous sediment.

Typically, 80 percent of the surface is covered with a desert pavement of rock fragments, mainly pebbles. The surface layer is light brown very gravelly fine sandy loam about 2 inches thick. The upper 38 inches of the underlying material is light brown very gravelly loamy sand, and the lower part to a depth of 60 inches or more is light brown, highly gypsiferous loamy sand. Rock fragments cover 70 to 90 percent of the surface. Depth to the gypsiferous layer ranges from 40 to 60 inches.

Included in this unit are about 5 percent Nickel soils on erosional fan remnants, 5 percent Rock outcrop as isolated low hills, and 5 percent Aztec soils on erosional

fan remnants. Included areas make up about 15 percent of the total acreage.

Permeability of this Arizo soil is very rapid to a depth of 40 inches and is moderately rapid below this depth. Available water capacity is very low. Effective rooting depth is 40 to 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is moderate. This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks.

Most areas of this unit are used as habitat for desert wildlife and for recreation. A few areas are used for urban development.

The main limitation for construction of dwellings is the hazard of flooding. Dikes and channels that have outlets for floodwater can be used to protect buildings from flooding. Gypsum in the soil can induce electrochemical action that corrodes concrete. This limitation can be overcome by using cement that is resistant to sulfate corrosion. Because of the high content of gypsum, the soil can settle if the gypsum dissolves and leaches from the soil when it is irrigated. The risk of settlement can be reduced by avoiding excessive irrigation. Protection for buildings can be provided in some areas by placing perforated drain tile around the foundation and using sewers as outlets. Subsidence in urban areas caused by the dissolution of gypsum in the soil can be prevented by using gutters and downspouts that discharge directly into the sewer system.

The main limitation for septic tank absorption fields is the inadequate filtration of effluent. Because the substratum is highly permeable, special design may be needed to avoid polluting ground water and nearby water supplies.

Channeling and deposition can be minimized and maintenance costs reduced by protecting roads from flooding. Concentrated runoff in drainage ditches can dissolve gypsum in the subsurface layers and cause subsidence.

The main limitations for lawns and landscaping are the content of cobbles and pebbles throughout the soil and the very low available water capacity. Topsoil is needed for best results when landscaping, particularly in areas used for lawns. Frequent irrigation of lawns, gardens, and most other plantings is needed because of the very low available water capacity of the soil. Because of the high content of gypsum, the soil can settle if the gypsum dissolves and leaches from the soil when it is irrigated. The risk of settlement can be reduced by avoiding excessive irrigation.

This map unit is in capability subclass VIIs, nonirrigated, and in horticultural group 3.

117—Arizo very gravelly fine sandy loam, 2 to 8 percent slopes. This very deep, excessively drained soil is on alluvial fans and inset fans. It formed in alluvium derived from various kinds of rock.

Typically, about 60 percent of the surface is covered with a desert pavement of pebbles. The surface layer is pale brown very gravelly fine sandy loam 6 inches thick. The underlying material to a depth of 60 inches or more is pale brown, stratified very gravelly loamy sand and cobbly coarse sand.

Included in this unit are about 5 percent Aztec soils on erosional fan remnants, 5 percent Pittman soils on erosional fan remnants, and 5 percent Arizo soils, flooded, in channels. Included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

Permeability of this Arizo soil is very rapid. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is moderate.

This unit is used mainly for urban development. It is also used as habitat for desert wildlife and for recreation.

Intermittent streams form the drainageways in this unit. These drainageways are subject to rare or occasional periods of high-velocity flooding. Care should be taken during urbanization to accommodate the runoff from the drainageways. If drains become plugged during a major flood, accelerated erosion and damage to roads, buildings, and other structures can occur. The presence of stones and cobbles interferes with the preparation of building sites.

The main limitation for septic tank absorption fields is inadequate filtration of effluent. Because the substratum is highly permeable, special design may be needed to avoid polluting ground water and nearby water supplies. If the density of housing is moderate to high, community sewage systems are needed to prevent contamination of water supplies as a result of seepage from onsite sewage disposal systems.

Unless an adequate wearing surface is maintained, stones and cobbles in the soil create road hazards and increase maintenance costs.

The main limitations for lawns and landscaping are the content of pebbles throughout the soil and the very low available water capacity. Topsoil is needed for best results when landscaping, particularly in areas used for lawns. Frequent irrigation of lawns, gardens, and most other plantings is needed because of the limited available water capacity of the soil.

This map unit is in capability subclasses IVs, irrigated, and VIIs, nonirrigated. It is in horticultural group 3.

120—Bluepoint fine sandy loam, wet, 0 to 2 percent slopes. This very deep, somewhat excessively drained soil is on sand sheets on alluvial flats. The natural drainage has been altered because excess irrigation has raised the water table. The soils formed in sandy alluvium derived from various kinds of rock.

Typically, the surface layer is light brown fine sandy loam 4 inches thick. The underlying material to a depth of 60 inches or more is light brown, stratified loamy fine sand and fine sand.

Included in this unit are about 5 percent Arizo soils, flooded, in channels and 5 percent Glencarb soils and 5 percent Land soils on the flood plain. Included areas make up about 15 percent of the total acreage.

Permeability of this Bluepoint soil is rapid. Available water capacity is moderate. Effective rooting depth is limited by a seasonal high water table. Runoff is very slow, and the hazard of water erosion is slight. The hazard of soil blowing is high. The seasonal high water table is at a depth of 48 to 72 inches in June through September. This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks.

This unit is used mainly as habitat for desert wildlife. It is also used for irrigated hay and urban development.

If this unit is used for hay and pasture, the main limitations are low fertility, the moderate available water capacity, and the moderately high water table. Annual applications of nitrogen and phosphorus are needed to maintain production of high quality irrigated pasture. The content of salts can be controlled by carefully applying irrigation water. Because the water intake rate is rapid, sprinkler irrigation is suited to the soil in this unit. Use of this method permits the even, controlled application of water, reduces runoff, and minimizes the risk of erosion. If furrow irrigation is used, water should be applied at frequent intervals and runs should be short. Because the soil is droughty, applications of irrigation water should be light and frequent. Irrigation water must be carefully applied to avoid raising the water table and increasing the concentration of salts in the soil. Tile drainage can be used to lower or maintain the level of the water table if a suitable outlet is available. Deep-rooted crops are suited to areas where the natural drainage is adequate or where a drainage system has been installed. Complete drainage is not desirable because the available water capacity is moderate. The average yield is 6 tons per acre for alfalfa hay grown under a high level of management.

The main limitation for construction of dwellings is the hazard of flooding. Dikes and channels that have outlets for floodwater can be used to protect buildings from flooding. Excavation for houses and access roads can expose material that is highly susceptible to soil blowing.

The main limitation for septic tank absorption fields is inadequate filtration of effluent. Because the substratum is highly permeable, special design may be needed to avoid polluting ground water and nearby water supplies.

The risk of channeling and deposition can be reduced by protecting roads from flooding. During prolonged dry periods, roads are difficult to maintain. Loose sand on the roads results in poor traction and increases the risk of soil blowing.

Because the soil is moderately droughty, applications of irrigation water to lawns and gardens should be light and frequent.

This map unit is in capability subclasses IIIw, irrigated, and VIIw, nonirrigated. It is in horticultural group 5.

127—Bluepoint loamy fine sand, 0 to 2 percent slopes. This very deep, somewhat excessively drained soil is on sand sheets on fan piedmonts. It formed in sandy alluvium derived dominantly from sandstone and quartzite.

Typically, about 15 percent of the surface is covered with a desert pavement of small pebbles. The surface layer is light yellowish brown loamy fine sand about 9 inches thick. The upper 15 inches of the underlying material is light brown, stratified fine sand to gravelly loamy fine sand, the next 17 inches is pink loamy fine sand, and the lower part to a depth of 60 inches or more is pink, stratified loamy sand to very fine sandy loam. Pebbles cover 5 to 25 percent of the surface.

Included in this unit are about 5 percent Knob Hill soils and 5 percent Caliza soils on erosional fan remnants. Included areas make up about 10 percent of the total acreage.

Permeability of this Bluepoint soil is rapid. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is very slow, and the hazard of water erosion is slight. The hazard of soil blowing is high.

This unit is used as habitat for desert wildlife and for recreation. It can be used for urban development.

This Bluepoint soil is well suited to the construction of dwellings. Excavation for houses and access roads can expose material that is highly susceptible to soil blowing.

The main limitation for septic tank absorption fields is inadequate filtration of effluent. Because the substratum is highly permeable, special design may be needed to avoid polluting ground water and nearby water supplies.

Roads can easily be constructed and maintained on this unit. During prolonged dry periods, roads are difficult to maintain. Loose sand on the roads results in poor traction and increases the risk of soil blowing.

Because the soil is moderately droughty, applications of irrigation water to lawns and gardens should be light and frequent.

This map unit is in capability subclasses IIIs, irrigated, and VIIs, nonirrigated. It is in horticultural group 3.

128—Bluepoint gravelly loamy fine sand, 2 to 4 percent slopes. This very deep, somewhat excessively drained soil is on sand sheets on fan piedmonts. It formed in sandy alluvium derived from various kinds of rock.

Typically, about 25 percent of the surface is covered with a desert pavement of small pebbles. The surface layer is light yellowish brown gravelly loamy fine sand about 9 inches thick. The upper 15 inches of the underlying material is light brown, stratified fine sand to

gravelly loamy fine sand, the next 17 inches is pink loamy fine sand, and the lower part to a depth of 60 inches or more is pink, stratified loamy sand to very fine sandy loam.

Included in this unit are about 5 percent Knob Hill soils and 5 percent Caliza soils on erosional fan remnants. Included areas make up about 10 percent of the total acreage.

Permeability of this Bluepoint soil is rapid. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is very slow, and the hazard of water erosion is slight. The hazard of soil blowing is high.

Most areas of this unit are used as habitat for desert wildlife and for recreation. A few areas are used for urban development.

This Bluepoint soil is well suited to the construction of dwellings. Excavation for houses and access roads can expose material that is highly susceptible to soil blowing.

The main limitation for septic tank absorption fields is inadequate filtration of effluent. Because the substratum is highly permeable, special design may be needed to avoid polluting ground water and nearby water supplies.

Roads can easily be constructed and maintained on this unit. During prolonged dry periods, roads are difficult to maintain. Loose sand on the roads results in poor traction and increases the risk of soil blowing.

Removing the desert pavement is necessary for best results when landscaping, particularly in areas used for lawns. Because the soil is moderately droughty, applications of irrigation water should be light and frequent.

This map unit is in capability subclasses IIIs, irrigated, and VIIs, nonirrigated. It is in horticultural group 3.

129—Bluepoint loamy fine sand, 4 to 15 percent slopes. This very deep, somewhat excessively drained soil is on sand dunes on alluvial flats. It formed in eolian deposits derived dominantly from sandstone and quartzite. Areas are very irregular in shape and are 5 to 100 acres in size.

Typically, the surface layer is pink loamy fine sand 2 inches thick. The underlying material to a depth of 60 inches or more is pink fine sand.

Included in this unit are about 5 percent Land soils on recent alluvial flats and 5 percent Las Vegas soils and 5 percent McCarran soils on relict alluvial flats. Included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

Permeability of this Bluepoint soil is rapid. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is very slow, and the hazard of water erosion is slight. The hazard of soil blowing is high.

This unit is used mainly as habitat for desert wildlife and for recreation. It is also used for urban development.

Slope is a concern in designing and constructing dwellings on this unit. This unit is easily leveled if proper equipment is used. Excavation for houses and access roads can expose material that is highly susceptible to soil blowing.

The main limitation for septic tank absorption fields is inadequate filtration of effluent. Because the substratum is highly permeable, special design may be needed to avoid polluting ground water and nearby water supplies. If the density of housing is moderate to high, community sewage systems are needed to prevent contamination of water supplies as a result of seepage from onsite sewage disposal systems.

Roads can easily be constructed and maintained on this unit if the proper equipment is used for leveling. During prolonged dry periods, roads are difficult to maintain. Loose sand on the roads results in poor traction and increases the risk of soil blowing.

Lawns and landscaping can be established and maintained through proper fertilizing, seeding, mulching, and shaping of the slopes. Because the soil is moderately droughty, applications of irrigation water should be light and frequent.

This map unit is in capability subclasses IVs, irrigated, and VIIs, nonirrigated. It is in horticultural group 3.

130—Bracken-Destazo complex, 2 to 15 percent slopes. This map unit is on dissected pediments.

This unit is 65 percent Bracken very cobbly fine sandy loam, 2 to 8 percent slopes, and 25 percent Destazo cobbly fine sandy loam, 8 to 15 percent slopes. The Bracken soil is on the summits of dissected pediments, and the Destazo soil is on the side slopes. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 10 percent Las Vegas soils on summits of basin floor remnants. The percentage varies from one area to another.

The Bracken soil is deep and somewhat excessively drained. It formed in gypsiferous residuum derived dominantly from gypsiferous sedimentary rock that has a component of limestone. Typically, about 80 percent of the surface is covered with a desert pavement of cobbles and pebbles. The surface layer is pink very cobbly fine sandy loam about 1 inch thick. The upper 4 inches of the underlying material is pink gravelly sandy loam, the next 48 inches is pink gravelly sandy loam with 75 percent gypsum crystals, and the lower part to a depth of 60 inches or more is weakly consolidated, gypsiferous sediment. Depth to the gypsiferous sediment ranges from 40 to 60 inches or more.

Permeability of the Bracken soil is moderately rapid. Available water capacity is very low. Effective rooting depth is 40 to 60 inches or more. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is high if the surface is disturbed.

The Destazo soil is very deep and well drained. It formed in alluvium derived dominantly from limestone and dolomite. Typically, about 50 percent of the surface

is covered with a desert pavement of cobbles and pebbles. The surface layer is pink cobbly fine sandy loam about 10 inches thick. The upper 21 inches of the underlying material is light brown very gravelly sandy clay loam, and the lower part to a depth of 60 inches or more is pink gravelly sandy loam that contains some gypsum. The pebbles and cobbles in the soil are mostly indurated lime nodules.

Permeability of the Destazo soil is moderately slow. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is moderate.

This unit is used mainly as habitat for desert wildlife and for recreation. It is also used for urban development.

Slope is a concern in designing and constructing dwellings on the Destazo soil. Application of excess water may dissolve enough gypsum in the Bracken soil to cause soil subsidence. Because of the high content of gypsum, the soil can settle if the gypsum dissolves and leaches from the soil when it is irrigated. The risk of settlement can be reduced by avoiding excessive irrigation. Protection for buildings can be provided in some areas by placing perforated drain tile around the foundation and using sewers as outlets. Subsidence in urban areas caused by the dissolution of gypsum in the soil can be prevented by using gutters and downspouts that discharge directly into the sewer system. Gypsum in the soil can induce electrochemical action that corrodes concrete. This limitation can be overcome by using cement that is resistant to sulfate corrosion.

The main limitation for septic tank absorption fields on the Bracken soil is inadequate filtration of effluent. Because the substratum is highly permeable, special design may be needed to avoid polluting ground water and nearby water supplies. The main limitation for septic tank absorption fields on the Destazo soil is restricted permeability. The operation of septic tank absorption fields can be improved in some areas by placing the absorption lines below the less permeable subsoil.

Cutting and filling can be reduced by building roads in the less sloping areas of the unit. Runoff concentrated in drainage ditches can dissolve enough gypsum in the Bracken soil to cause soil subsidence.

The main limitation for lawns and landscaping is the large stones on the surface. The Bracken soil also has a very low available water capacity and a high content of gypsum. The desert pavement limits the use of most equipment. Removing the desert pavement is necessary for best results in landscaping. Frequent irrigation of lawns, gardens, and most other plantings is needed because of the very low available water capacity of the Bracken soil. Application of excess water can dissolve enough gypsum in the soil to cause soil subsidence. Lawn grasses, shrubs, and trees that are not sensitive to lime-induced chlorosis are well suited to use in landscaping. Annual applications of iron chelates reduce the effects of chlorosis.

This map unit is in capability subclass VIIs, nonirrigated. The Bracken soil is in horticultural group 3, and the Destazo soil is in horticultural group 2.

132—Bracken very gravelly fine sandy loam, 2 to 8 percent slopes. This deep, somewhat excessively drained soil is on pediments and alluvial flats. It formed in gypsiferous alluvium derived from various kinds of rock high in gypsum.

Typically, about 90 percent of the surface is covered with a desert pavement of pebbles and cobbles. The surface layer is pink very gravelly fine sandy loam about 5 inches thick. The upper 12 inches of the underlying material is pink gravelly sandy loam, the next 32 inches is white gravelly sandy loam and gypsum crystals, and the lower part to a depth of about 60 inches or more is weakly consolidated, gypsiferous sediment. Depth to the gypsiferous sediment ranges from 40 to 60 inches or more.

Included in this unit are about 5 percent Grapevine soils and 5 percent McCarran soils on relict alluvial flats. Included areas make up about 10 percent of the total acreage. The percentage varies from one area to another.

Permeability of this Bracken soil is moderately rapid. Available water capacity is very low. Effective rooting depth is 40 to 60 inches. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is high if the surface is disturbed.

This unit is used mainly as habitat for desert wildlife and for recreation. It is also used for urban development.

Because of the high content of gypsum, the soil can settle if the gypsum dissolves and leaches from the soil when it is irrigated. The risk of settlement can be reduced by avoiding excessive irrigation. Protection for buildings can be provided in some areas by placing perforated drain tile around the foundation and using sewers as outlets. Subsidence in urban areas caused by the dissolution of gypsum in the soil can be prevented by using gutters and downspouts that discharge directly into the sewer system. Gypsum in the soil can induce electrochemical action that corrodes concrete. This limitation can be overcome by using cement that is resistant to sulfate corrosion.

The main limitation for septic tank absorption fields is inadequate filtration of effluent. Because the substratum is highly permeable, special design may be needed to avoid polluting ground water and nearby water supplies.

Roads can easily be constructed and maintained on this unit. Concentrated runoff in drainage ditches can dissolve gypsum in the subsurface layers and cause subsidence.

The main limitation for lawns and landscaping is the very low available water capacity. Frequent irrigation of lawns, gardens, and most other plantings is needed.

Removal of pebbles and cobbles from the surface is needed for best results when landscaping. Applying excess water can dissolve enough gypsum in the soil to cause soil subsidence. Lawn grasses, shrubs, and trees that are not sensitive to lime-induced chlorosis are well suited to use in landscaping. Annual applications of iron chelates reduce the effects of chlorosis.

This map unit is in capability subclasses IVs, irrigated, and VIIs, nonirrigated. It is in horticultural group 3.

133—Bracken-Rock outcrop complex, 8 to 30 percent slopes. This map unit is on dissected pediments.

This unit is 65 percent Bracken very gravelly sandy loam, 8 to 30 percent slopes, eroded, and 20 percent Rock outcrop. The Bracken soil is on dissected pediments, and Rock outcrop is on side slopes of dissected pediments. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are about 10 percent Aztec soils 2 to 8 percent slopes, on erosional fan remnants and 5 percent Anzo soils, flooded, in channels. Included areas make up about 15 percent of the total acreage.

The Bracken soil is deep and somewhat excessively drained. It formed in residuum derived dominantly from weakly consolidated, gypsiferous sediment. Typically, 95 percent of the surface is covered with pebbles. The surface layer is pink very gravelly sandy loam about 1 inch thick. The upper 40 inches of the underlying material is pink sandy loam and gravelly sandy loam, averaging sandy loam and containing about 75 percent gypsum crystals, and the lower part to a depth of 60 inches or more is weakly consolidated, gypsiferous sediment. Depth to the gypsiferous sediment ranges from 40 to 60 inches or more.

Permeability of the Bracken soil is moderately rapid. Available water capacity is very low. Effective rooting depth is 40 to 60 inches or more. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is high if the surface is disturbed.

Rock outcrop consists of exposed areas of igneous and metamorphic rock.

This unit is used as habitat for desert wildlife and for recreation.

This unit is limited for roads because of slope in some areas and Rock outcrop. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should be provided with adequate surface drainage. Channeling and deposition can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed. Gypsum in the soil can induce electrochemical action that corrodes concrete. This limitation can be overcome by using cement that is resistant to sulfate corrosion. Concentrated runoff in drainage ditches can dissolve gypsum in the subsurface layers and cause subsidence.

This map unit is in capability subclass VIIs, nonirrigated. The Bracken soil is in horticultural group 3.

134—Bracken very gravelly fine sandy loam, 4 to 30 percent slopes. This deep, somewhat excessively drained soil is on dissected pediments. It formed in residuum derived dominantly from weakly consolidated, gypsiferous sediment.

Typically, 95 percent of the surface is covered with pebbles. The surface layer is pink very gravelly fine sandy loam about 1 inch thick. The upper 52 inches of the underlying material is pink sandy loam and gravelly sandy loam that averages sandy loam and contains about 75 percent gypsum crystals, and the lower part to a depth of 60 inches or more is weakly consolidated, gypsiferous sediment. Depth to the gypsiferous sediment ranges from 40 to 60 inches or more.

Included in this unit is about 5 percent Aztec soils, 2 to 8 percent slopes, on erosional fan remnants. The percentage varies from one area to another.

Permeability of the Bracken soil is moderately rapid. Available water capacity is very low. Effective rooting depth is 40 to 60 inches or more. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is high if the surface is disturbed.

This unit is used as habitat for desert wildlife and for recreation.

This unit is limited for roads because of steepness of slope in some areas. Cutting and filling can be reduced by building roads in the less sloping areas. Roads should have adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed. Gypsum in the soil can induce electrochemical action that corrodes concrete. This limitation can be overcome by using cement that is resistant to sulfate corrosion. Concentrated runoff in drainage ditches can dissolve gypsum in the subsurface layers and cause subsidence.

This map unit is in capability subclass VIIs, nonirrigated, and in horticultural group 3.

140—Casaga very gravelly sandy clay loam, 0 to 8 percent slopes. This very deep, well drained soil is on erosional fan remnants. It formed in mixed alluvium derived dominantly from limestone and gypsiferous sediment.

Typically, 85 percent of the surface is covered with a desert pavement of pebbles and cobbles. A dark desert varnish is on the exposed surfaces of the rock fragments. The surface layer is white very gravelly sandy clay loam about 1 inch thick. The subsoil is very pale brown and brown clay loam about 20 inches thick. The upper 20 inches of the underlying material is light brown very gravelly clay loam, and the lower part to a depth of 60 inches or more is pinkish white, stratified very gravelly and gravelly sandy loam.

Included in this unit are about 10 percent Bracken soils on dissected pediments and 5 percent Weiser soils on erosional fan remnants. Included areas make up about 15 percent of the total acreage

Permeability of the Casaga soil is slow. Available water capacity is high Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high if the desert pavement is disturbed. This soil is moderately affected by salts to a depth of 1 inch, slightly affected to a depth of 41 inches, and moderately affected below this depth

This unit is used mainly as habitat for desert wildlife and for recreation It is also used for urban development

The effects of shrinking and swelling on dwellings can be minimized by using an appropriate engineering design and by backfilling with material that has a low shrink-swell potential. Gypsum in the soil can induce electrochemical action that corrodes concrete This limitation can be overcome by using cement that is resistant to sulfate corrosion

The main limitation for septic tank absorption fields is the restricted permeability. Using long absorption lines and backfilling the trench with sandy material help to compensate for the restricted permeability The operation of septic tank absorption fields can be improved in some areas by placing the absorption lines below the less permeable subsoil.

Trafficability of roads can be improved by providing a stable base and an adequate wearing surface.

The main limitations for lawns and landscaping are the presence of pebbles and excess salts throughout the soil. Removing the desert pavement is necessary for best results when landscaping, particularly in areas used for lawns. Because of the content of gypsum and other salts in the soil, salt-tolerant plants should be selected.

This map unit is in capability subclasses IVe, irrigated, and VIIc, nonirrigated. It is in horticultural group 4.

150—Cave very stony sandy loam, 0 to 4 percent slopes. This very shallow, well drained soil is on erosional fan remnants. It formed in alluvium derived from various kinds of rock.

Typically, about 70 percent of the surface is covered with a desert pavement of rock fragments and pan fragments. The surface layer is very pale brown very stony sandy loam about 3 inches thick. The underlying material to a depth of 6 inches is very pale brown gravelly sandy loam. The next layer to a depth of 60 inches or more is an indurated, lime-cemented hardpan. Depth to the hardpan ranges from 4 to 20 inches

Included in this unit are about 5 percent Arizo soils, flooded, 0 to 4 percent slopes, in channels and 5 percent Caliza very stony fine sandy loam, 2 to 8 percent slopes, on erosional fan remnants. Included areas make up about 10 percent of the total acreage. The percentage varies from one area to another

Permeability of the Cave soil is moderate above the hardpan Available water capacity is very low Effective rooting depth is 4 to 20 inches. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high if the surface is disturbed

Most areas of this unit are used as habitat for desert wildlife and for recreation. A few areas are used for urban development

If this unit is used for urban development, the main limitation is the shallow depth to the lime-cemented hardpan. Heavy equipment is needed for excavation of building sites. Special design of septic tank absorption fields is needed

Roads should be designed to minimize cuts because of the limited depth to the hardpan

Removing the desert pavement is necessary for best results when landscaping, particularly in areas used for lawns It is difficult to establish plants in areas where the pan is exposed. Mulching and fertilizing cut areas help to establish plants Selection of adapted vegetation is critical for the establishment of lawns, shrubs trees, and vegetable gardens. Lawn grasses, shrubs, and trees that are not sensitive to lime-induced chlorosis are well suited to use in landscaping. Annual applications of iron chelates reduce the effects of chlorosis

Intermittent streams form the drainageways in this unit These drainageways are subject to rare or occasional periods of high-velocity flooding Care should be taken during urbanization to accommodate the runoff from the drainageways. If drains become plugged during a major flood, accelerated erosion and damage to roads, buildings, and other structures can occur.

This map unit is in capability subclass VIIs, nonirrigated, and in horticultural group 6

151—Cave loamy fine sand, 2 to 8 percent slopes. This shallow, well drained soil is on erosional fan remnants. It formed in alluvium derived from various kinds of rock

Typically, the surface layer is light brown loamy fine sand about 5 inches thick The underlying material to a depth of 11 inches is pink gravelly fine sandy loam. The next layer to a depth of 60 inches or more is an indurated, lime-cemented hardpan. Depth to the hardpan ranges from 10 to 20 inches.

Included in this unit is small areas of Arizo soils, flooded, in channels. Included areas make up about 5 percent of the total acreage

Permeability of the Cave soil is moderate above the hardpan. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. Runoff is slow and the hazard of water erosion is slight. The hazard of soil blowing is high

This unit is used as habitat for desert wildlife and for recreation.

This unit is limited for roads because of the depth to the indurated hardpan. Roads should be designed to minimize cuts.

This map unit is in capability subclass VIIs, nonirrigated, and in horticultural group 6.

152—Cave gravelly fine sandy loam, 0 to 4 percent slopes. This shallow, well drained soil is on erosional fan remnants. It formed in alluvium derived from various kinds of rock.

Typically, about 80 percent of the surface is covered with a desert pavement of pebbles and cobbles. The surface layer is pale brown gravelly fine sandy loam about 12 inches thick. The next layer to a depth of 36 inches is an indurated, lime-cemented hardpan. The underlying material to a depth of 60 inches or more is light brown very gravelly sandy loam. Depth to the hardpan ranges from 4 to 20 inches.

Included in this unit are about 5 percent Arizo soils, flooded, in channels, 5 percent Canutio soils on inset fans, and 5 percent Grapevine soils on side slopes of erosional fan remnants. Included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

Permeability of the Cave soil is moderate above the hardpan. Available water capacity is very low. Effective rooting depth is 4 to 20 inches. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high if the surface is disturbed.

This unit is used mainly for urban development. It is also used as habitat for desert wildlife and for recreation.

This unit is poorly suited to urban development. The main limitation is the shallow depth to the hardpan. Excavation for building sites is limited by the hardpan, and heavy equipment is needed. Special design of septic tank absorption fields is needed.

Roads should be designed to minimize cuts because of the limited depth to the hardpan.

It is difficult to establish plants in areas where the pan is exposed. Mulching and fertilizing cut areas help to establish plants. Lawn grasses, shrubs, and trees that are not sensitive to lime-induced chlorosis are well suited to use in landscaping. Annual applications of iron chelates reduce the effects of chlorosis.

Intermittent streams form the drainageways in this unit. These drainageways are subject to rare or occasional periods of high-velocity flooding. Care should be taken during urbanization to accommodate the runoff from the drainageways. If drains become plugged during a major flood, accelerated erosion and damage to roads, buildings, and other structures can occur.

This map unit is in capability subclass VIIs, nonirrigated, and in horticultural group 6.

155—Cave gravelly fine sandy loam, 4 to 15 percent slopes. This shallow, well drained soil is on erosional fan remnants. It formed in alluvium derived from various kinds of rock.

Typically, about 70 percent of the surface is covered with a desert pavement of rock fragments and pan fragments. The surface layer is light brown gravelly fine sandy loam about 5 inches thick. The underlying material to a depth of 15 inches is light brown gravelly fine sandy loam. The next layer to a depth of 60 inches or more is an indurated, lime-cemented hardpan. Depth to the hardpan ranges from 4 to 20 inches.

Included in this unit are about 5 percent Arizo soils, flooded, in channels and 5 percent Caliza soils on side slopes of erosional fan remnants. Included areas make up about 10 percent of the total acreage. The percentage varies from one area to another.

Permeability of the Cave soil is moderate above the hardpan. Available water capacity is very low. Effective rooting depth is 4 to 20 inches. Runoff is moderate, and the hazard of water erosion is slight. The hazard of soil blowing is high if the surface is disturbed.

This unit is used as habitat for desert wildlife and for recreation.

This unit is limited for roads because of the depth to the indurated hardpan. Roads should be designed to minimize cuts. Cutting and filling can be reduced by building roads in the less sloping areas.

This map unit is in capability subclass VIIs, nonirrigated and in horticultural group 6.

160—Destazo cobbly fine sandy loam, 0 to 2 percent slopes. This very deep, well drained soil is on relict alluvial flats. It formed in alluvium derived dominantly from limestone and dolomite.

Typically, about 60 percent of the surface is covered with a desert pavement of pebbles and cobbles. The surface layer is pink cobbly fine sandy loam about 11 inches thick. The upper 29 inches of the underlying material is light brown very gravelly sandy clay loam, and the lower part to a depth of 60 inches or more is pinkish white gravelly sandy loam containing some crystalline gypsum.

Included in this unit are about 5 percent Bracken very cobbly fine sandy loam, 2 to 8 percent slopes, on side slopes of slightly higher remnants of relict alluvial flats and 10 percent Las Vegas soils on summits of slightly higher remnants of alluvial flats. Included areas make up about 15 percent of the total acreage.

Permeability of this Destazo soil is moderately slow. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is moderate.

This unit is used mainly as habitat for desert wildlife and for recreation. It is also used for urban development.

This unit is well suited to the construction of dwellings.

The main limitation for septic tank absorption fields is restricted permeability. The operation of septic tank

absorption fields can be improved in some areas by placing the absorption lines below the less permeable subsoil. Using long absorption lines and backfilling the trench with sandy material help to compensate for the restricted permeability.

Roads can easily be constructed and maintained on this unit.

The main limitation for lawns and landscaping is the desert pavement. The desert pavement interferes with the use of equipment. Removal of pebbles and cobbles from the surface is needed for best results when landscaping. Lawn grasses, shrubs, and trees that are not sensitive to lime-induced chlorosis are well suited to use in landscaping. Annual applications of iron chelates reduce the effects of chlorosis.

This map unit is in capability subclasses IVs, irrigated, and VIIs, nonirrigated. It is in horticultural group 2.

181—Caliza-Pittman extremely stony fine sandy loams, 2 to 8 percent slopes. This map unit is on fan remnants.

This unit is 50 percent Caliza extremely stony fine sandy loam, 2 to 8 percent slopes, and 40 percent Pittman extremely stony fine sandy loam, 2 to 8 percent slopes. The Caliza soil is on erosional fan remnants, and the Pittman soil is on nonburied fan remnants. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 10 percent Arizo soils, flooded, in channels.

The Caliza soil is very deep and well drained. It formed in alluvium derived from various kinds of rock. Typically, about 75 percent of the surface is covered with a desert pavement of stones, cobbles, and pebbles. The surface layer is light brown extremely stony fine sandy loam about 2 inches thick. The upper 12 inches of the underlying material is pink very gravelly sandy loam, and the lower part to a depth of 60 inches or more is light brown and pink, stratified very gravelly loamy sand to very gravelly coarse sand.

Permeability of the Caliza soil is moderately rapid. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is moderate if the surface is disturbed.

The Pittman soil is moderately deep and well drained. It formed in alluvium derived from various kinds of rock. Typically, about 75 percent of the surface is covered with a desert pavement of stones, cobbles, and pebbles. The surface layer is pale brown extremely stony fine sandy loam about 2 inches thick. The upper 21 inches of the underlying material is light brown, stratified gravelly loam to extremely gravelly coarse sand, the next 9 inches is an indurated, lime-cemented hardpan, and the lower part to a depth of 50 inches or more is a strongly lime-cemented hardpan. The next layer to a depth of 60 inches or more is light brown very gravelly sand. Depth to the hardpan ranges from 20 to 30 inches.

Permeability of the Pittman soil is rapid above the hardpan. Available water capacity is very low. Effective rooting depth is 20 to 30 inches. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is moderate if the surface is disturbed.

This unit is used mainly as habitat for desert wildlife and for recreation. It is also used for urban development.

The presence of stones and cobbles throughout the soil interferes with the preparation of building sites. Deep cutting should be avoided because of the limited depth to the underlying hardpan in the Pittman soil.

The main limitation for septic tank absorption fields on the Pittman soil is the limited depth to the hardpan, and deep cutting should be avoided.

In areas of the Pittman soil, stones and cobbles in the soil create road hazards and increase maintenance cost unless an adequate wearing surface is maintained.

The main limitations for lawns and landscaping are the desert pavement and the very low available water capacity of the Pittman soil. The desert pavement interferes with the use of equipment. Topsoil is needed for best results when landscaping, particularly in areas used for lawns. Frequent irrigation of lawns, gardens, and most other plantings is needed because of the very low available water capacity of the Pittman soil.

Intermittent streams form the drainageways in this unit. These drainageways are subject to rare or occasional periods of high-velocity flooding. Care should be exercised during urbanization to accommodate the runoff from drainageways. If drains become plugged during a major flood, accelerated erosion and damage to roads, buildings, and other structures can occur.

This map unit is in capability subclass VIIs, nonirrigated. The Caliza soil is in horticultural group 2, and the Pittman soil is in horticultural group 6.

182—Caliza-Pittman-Arizo complex, 0 to 8 percent slopes. This map unit is on fan piedmonts.

This unit is 60 percent Caliza extremely cobbly fine sandy loam, 2 to 8 percent slopes, 20 percent Pittman extremely cobbly fine sandy loam, 2 to 8 percent slopes, and 15 percent Arizo very gravelly loamy sand, flooded, 0 to 4 percent slopes. The Caliza soil is on erosional fan remnants, the Pittman soil is on nonburied fan remnants, and the Arizo soil is in channels. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 5 percent Nickel soils on side slopes of erosional fan remnants.

The Caliza soil is very deep and well drained. It formed in alluvium derived from various kinds of rock. Typically, about 75 percent of the surface is covered with a desert pavement of cobbles and pebbles. The surface layer is light brown extremely cobbly fine sandy loam about 2 inches thick. The upper 12 inches of the underlying

material is pink very gravelly sandy loam, and the lower part to a depth of 60 inches or more is light brown and pink, stratified very gravelly loamy sand to very gravelly coarse sand

Permeability of the Caliza soil is moderately rapid. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is moderate if the surface is disturbed.

The Pittman soil is moderately deep and well drained. It formed in alluvium derived from various kinds of rock. Typically, about 75 percent of the surface is covered with a desert pavement of cobbles and pebbles. The surface layer is pale brown extremely cobbly fine sandy loam about 2 inches thick. The upper 21 inches of the underlying material is light brown, stratified gravelly loam to extremely gravelly coarse sand, the next 9 inches is a pinkish white and pink indurated, lime-cemented hardpan, and the lower part to a depth of 50 inches or more is a light brown, stratified, weakly cemented to indurated, lime-cemented hardpan. The next layer to a depth of 60 inches or more is a light brown very gravelly sand. Depth to the hardpan ranges from 20 to 30 inches

Permeability of the Pittman soil is rapid above the hardpan. Available water capacity is very low Effective rooting depth is 20 to 30 inches. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is moderate if the surface is disturbed.

The Arizo soil is very deep and excessively drained. It formed in alluvium derived from various kinds of rock Typically, about 80 percent of the surface is covered with a desert pavement of pebbles and a few cobbles. The surface layer is light brown very gravelly loamy sand about 8 inches thick. The underlying material to a depth of 60 inches or more is light brownish gray, stratified cobbly coarse sand to very gravelly loamy sand.

Permeability of the Arizo soil is very rapid. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high if the surface is disturbed This soil is subject to occasional periods of very brief, high-velocity flooding from March through September

This unit is used mainly as habitat for desert wildlife and for recreation. It is also used for urban development

The main limitation for construction of dwellings is the hazard of flooding on the Arizo soil. Construction is moderately limited in areas of the Pittman soil by the depth to the hardpan and the content of cobbles throughout the soil. Dikes and channels that have outlets for floodwater can be used to protect buildings from flooding. Deep cutting should be avoided because of the limited depth to the underlying hardpan in the Pittman soil. Stones and cobbles interfere with the preparation of building sites

The main limitations for septic tank absorption fields are the limited depth to the hardpan in areas of the Pittman soil and the hazard of flooding and inadequate filtration of effluent in areas of the Arizo soil Excavation is limited by the hardpan. Special design of septic tank absorption fields is needed. Dikes and channels that have outlets for floodwater can be used to protect onsite sewage disposal systems from flooding. Because the substratum is highly permeable, special design may be needed to avoid polluting ground water and nearby water supplies. If the density of housing is moderate to high, community sewage systems are needed to prevent contamination of water supplies as a result of seepage from onsite sewage disposal systems.

This unit is limited for roads because of the hazard of flooding on the Arizo soil Construction of roads is moderately limited in areas of the Pittman soil by the depth to the hardpan and the content of cobbles Flooding can be controlled only by use of major flood control structures The Caliza and Pittman soils in this unit are flooded less frequently and are more suitable for use as sites for roads. Roads should be designed to minimize cuts on the Pittman soil. The desert pavement interferes with the use of equipment.

The main limitations for lawns and landscaping are the very low available water capacity of the Pittman and Arizo soils and the content of cobbles and pebbles in the soils. Frequent irrigation of lawns, gardens, and most other plantings is needed because of the very low available water capacity of the soil. Topsoil is needed for best results when landscaping, particularly in areas used for lawns Lawn grasses shrubs, and trees that are not sensitive to lime-induced chlorosis are well suited to use in landscaping. Annual applications of iron chelates reduce the effects of chlorosis.

This map unit is in capability subclass VIIs, nonirrigated. The Caliza soil is in horticultural group 2, the Pittman is in horticultural group 6, and the Arizo soil is in horticultural group 3.

183—Caliza very cobbly loamy sand, 4 to 8 percent slopes. This very deep, well drained soil is on erosional fan remnants. It formed in alluvium derived from various kinds of rock.

Typically, the surface layer is light brown very cobbly loamy sand about 3 inches thick. The underlying material to a depth of 60 inches or more is light brown, stratified very gravelly loamy sand to very gravelly coarse sand There are layers of weakly lime-cemented material in the upper part of the underlying material

Included in this unit are about 10 percent Aztec soils on erosional fan remnants. The percentage varies from one area to another

Permeability of the Caliza soil is moderately rapid. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is moderate

This unit is used mainly as habitat for desert wildlife and for recreation. It is also used for urban development.

This unit is well suited to the construction of dwellings. Unless the density of housing is too high, septic tank absorption fields normally function well on this unit.

Roads can easily be constructed and maintained on this unit.

The main limitations for lawns and landscaping are the cobbles and pebbles throughout the soil. Topsoil is needed for best results when landscaping, particularly in areas used for lawns. Lawn grasses, shrubs, and trees that are not sensitive to lime-induced chlorosis are well suited to use in landscaping. Annual applications of iron chelates reduce the effects of chlorosis.

This map unit is in capability subclass VIIs, nonirrigated, and in horticultural group 2.

184—Caliza very gravelly sandy loam, 2 to 8 percent slopes. This very deep, well drained soil is on erosional fan remnants. It formed in alluvium derived from various kinds of rock.

Typically, the surface layer is light brown very gravelly sandy loam about 3 inches thick. The upper 13 inches of the underlying material is light brown very gravelly sandy loam, and the lower part to a depth of 60 inches or more is light brown, stratified very gravelly coarse sand to very gravelly loamy sand.

Included in this unit is about 5 percent Aztec soils on erosional fan remnants. The percentage varies from one area to another.

Permeability of the Caliza soil is moderately rapid. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is moderate. This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks.

This unit is used mainly as habitat for desert wildlife and for recreation. It is also used for urban development.

The main limitation for construction of dwellings is the hazard of flooding.

Dikes and channels that have outlets for floodwater can be used to protect onsite sewage disposal systems from flooding.

Channeling and deposition can be minimized and maintenance costs reduced by protecting roads from flooding.

The main limitation for lawns and landscaping is the content of pebbles in the soil. Topsoil is needed for best results when landscaping, particularly in areas used for lawns. Lawn grasses, shrubs, and trees that are not sensitive to lime-induced chlorosis are well suited to use in landscaping. Annual applications of iron chelates reduce the effects of chlorosis.

This map unit is in capability subclasses IVs, irrigated, and VIIs, nonirrigated. It is in horticultural group 2.

187—Caliza extremely cobbly fine sandy loam, 2 to 8 percent slopes. This very deep, well drained soil is on inset fan remnants. It formed in alluvium derived from various kinds of rock.

Typically, about 85 percent of the surface is covered with a desert pavement of cobbles, stones, and pebbles. The surface layer is a light brown extremely cobbly fine sandy loam about 2 inches thick. The upper 12 inches of the underlying material is light brown and pink very gravelly sandy loam, and the lower part to a depth of 60 inches or more is light brown and pink, stratified material that averages very gravelly loamy coarse sand. In some areas of similar included soils, the surface layer is extremely stony fine sandy loam.

Included in this unit are about 5 percent Arizo soils, flooded, in channels, 5 percent Pittman soils on erosional fan remnants; and 5 percent Aztec soils on erosional fan remnants. Included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

Permeability of this Caliza soil is moderately rapid. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is moderate if the surface is disturbed.

This unit is used mainly as habitat for desert wildlife and for recreation. It is also used for urban development.

This unit is well suited to the construction of dwellings. Unless the density of housing is too high, septic tank absorption fields normally function well on this unit.

Roads can easily be constructed and maintained on this unit.

The main limitation for lawns and landscaping is the stones, cobbles, and pebbles on the surface and throughout the soil. Topsoil is needed for best results when landscaping, particularly in areas used for lawns. Lawn grasses, shrubs, and trees that are not sensitive to lime-induced chlorosis are well suited to use in landscaping. Annual applications of iron chelates reduce the effects of chlorosis.

Intermittent streams form the drainageways in this unit. These drainageways are subject to rare or occasional periods of high-velocity flooding. Care should be taken during urbanization to accommodate the runoff from the drainageways. If drains become plugged during a major flood, accelerated erosion and damage to roads, buildings, and other structures can occur.

This map unit is in capability subclass VIIs, nonirrigated, and in horticultural group 2.

190—Dallan very gravelly fine sandy loam, 2 to 4 percent slopes. This very deep, well drained soil is on fan skirts. It formed in alluvium derived dominantly from limestone and dolomite.

Typically, 65 percent of the surface is covered with a weakly developed desert pavement of pebbles. The surface layer is light yellowish brown very gravelly fine

sandy loam about 4 inches thick. The upper 7 inches of the underlying material is light yellowish brown extremely gravelly fine sandy loam, the next 6 inches is light yellowish brown very gravelly sandy loam, and the lower part to a depth of 61 inches is light yellowish brown extremely gravelly fine sandy loam. Pebbles cover 50 to 75 percent of the surface.

Included in this unit are about 5 percent Tencee soils on erosional fan remnants and 10 percent Arizo soils, flooded, in channels. Included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

Permeability of this Dalian soil is moderately rapid. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is moderate.

This unit is used mainly as habitat for desert wildlife and for recreation. It is also used for urban development.

This unit is well suited to the construction of dwellings.

Septic tank absorption fields generally function well unless the density of housing is too high.

Roads are easily constructed and maintained.

The main limitation for lawns and landscaping is the pebbles on the surface and throughout the soil. Topsoil is needed for best results when landscaping, particularly in areas used for lawns. Lawn grasses, shrubs, and trees that are not sensitive to lime-induced chlorosis are well suited to use in landscaping. Annual applications of iron chelates reduce the effects of chlorosis.

Intermittent streams form the drainageways in this unit. These drainageways are subject to rare or occasional periods of high-velocity flooding. Care should be taken during urbanization to accommodate the runoff from the drainageways. If drains become plugged during a major flood, accelerated erosion and damage to roads, buildings, and other structures can occur.

This map unit is in capability subclasses IVs, irrigated, and VIIs, nonirrigated. It is in horticultural group 2.

191—Dalian very cobbly fine sandy loam, 2 to 8 percent slopes. This very deep, well drained soil is on fan skirts. It formed in alluvium derived dominantly from limestone and dolomite.

Typically, about 85 percent of the surface is covered with a desert pavement of rock fragments. The surface layer is light yellowish brown very cobbly fine sandy loam about 5 inches thick. The underlying material to a depth of 60 inches or more is light yellowish brown very gravelly sandy loam to extremely gravelly fine sandy loam.

Included in this unit are about 10 percent Tencee soils on erosional fan remnants and 5 percent Arizo soils, flooded, in channels. Included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

Permeability of this Dalian soil is moderately rapid. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is moderate if the surface is disturbed. This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks.

Most areas of this unit are used as habitat for desert wildlife and for recreation. A few areas are used for urban development.

The main limitation for construction of dwellings is the hazard of flooding. Dikes and channels that have outlets for floodwater can be used to protect buildings from flooding.

Dikes and channels that have outlets for floodwater can be used to protect onsite sewage disposal systems from flooding.

Channeling and deposition can be minimized and maintenance costs reduced by protecting roads from flooding.

The main limitations for lawns and landscaping are the cobbles and pebbles on the surface and throughout the soil. Topsoil is needed for best results when landscaping, particularly in areas used for lawns. Lawn grasses, shrubs, and trees that are not sensitive to lime-induced chlorosis are well suited to use in landscaping. Annual applications of iron chelates reduce the effects of chlorosis.

This map unit is in capability subclass VIIs, nonirrigated, and in horticultural group 2.

192—Dalian-McCullough complex, 0 to 4 percent slopes. This map unit is on fan skirts.

This unit is 55 percent Dalian very gravelly fine sandy loam, 0 to 4 percent slopes, and 35 percent McCullough very gravelly very fine sandy loam, gravelly substratum, 0 to 4 percent slopes. Both the Dalian and McCullough soils are on alluvial fan skirts. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are about 5 percent Las Vegas soils on basin floor remnants and 5 percent Tencee soils on erosional fan remnants. Included areas make up about 10 percent of the total acreage.

The Dalian soil is very deep and well drained. It formed in alluvium derived from various kinds of rock. Typically, about 75 percent of the surface is covered with a desert pavement of pebbles. The surface layer is light yellowish brown very gravelly fine sandy loam about 5 inches thick. The underlying material to a depth of 60 inches or more is light yellowish brown very gravelly sandy loam.

Permeability of the Dalian soil is moderately rapid. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is

moderate if the surface is disturbed. This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks.

The McCullough soil is very deep and well drained. It formed in alluvium derived from various kinds of rock. Typically, about 75 percent of the surface is covered with a desert pavement of pebbles. The surface layer is pale brown very gravelly very fine sandy loam about 5 inches thick. The subsoil and upper part of the substratum to a depth of 30 inches are light yellowish brown, stratified loam to sandy loam, the next 10 inches or more is light yellowish brown, stratified coarse sand to loamy fine sand, and the lower part to a depth of 60 inches or more is light yellowish brown extremely gravelly loamy sand.

Permeability of the McCullough soil is moderate. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high if the surface is disturbed. This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks.

This unit is used mainly as habitat for desert wildlife and for recreation. It is also used for urban development.

The main limitation for construction of dwellings is the hazard of flooding. Dikes and channels that have outlets for floodwater can be used to protect buildings from flooding.

If the McCullough soil is used for septic tank absorption fields, the limitation of restricted permeability can be overcome by increasing the size of the absorption field.

Channeling and deposition can be minimized and maintenance costs reduced by protecting roads from flooding.

The main limitation for lawns and landscaping in areas of the Dalian soil is the pebbles on the surface and throughout the soil. Topsoil is needed for best results when landscaping, particularly in areas used for lawns. Lawn grasses, shrubs, and trees that are not sensitive to lime-induced chlorosis are well suited to use in landscaping. Annual applications of iron chelates reduce the effects of chlorosis.

This map unit is in capability subclasses IVs, irrigated, and VIIs, nonirrigated. It is in horticultural group 2.

200—Glencarb silt loam. This very deep, well drained soil is on recent alluvial flats. It formed in alluvium derived from various kinds of rock. Slope is 0 to 2 percent.

Typically, the surface layer is pale brown silt loam about 6 inches thick. The upper 10 inches of the underlying material is very pale brown clay loam, and the next 35 inches is very pale brown silty clay loam. The next layer to a depth of 54 inches is very pale brown very fine sandy loam. The lower part to a depth of 60 inches or more is a very pale brown silty clay loam.

Included in this unit are about 3 percent Bluepoint soils on sand sheets, 9 percent Land soils intermingled with the Glencarb soils on recent alluvial flats, and 3 percent McCarran soils on relict alluvial flats. Included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

Permeability of this Glencarb soil is moderately slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high. This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks. This soil is slightly affected by salts below a depth of 6 inches.

This unit is used as habitat for desert wildlife and for recreation and urban development.

The main limitation for construction of dwellings is the hazard of flooding. Dikes and channels that have outlets for floodwater can be used to protect buildings from flooding.

The main limitation for septic tank absorption fields is restricted permeability of the soil. Poor permeability increases the possibility of failure of septic tank absorption fields. Using long absorption lines and backfilling the trench with sandy material help to compensate for the restricted permeability.

Channeling and deposition can be minimized and maintenance costs reduced by protecting roads from flooding. Trafficability of roads can be improved by providing a stable base and an adequate wearing surface.

Most climatically adapted plants can be used for lawns and landscaping in this unit.

This map unit is in capability subclasses IIs, irrigated, and VIIc, nonirrigated. It is in horticultural group 1.

206—Glencarb silt loam, flooded. This very deep, well drained soil is on flood plains. The drainage has been altered by seepage. The soil formed in alluvium derived from various kinds of rock. Slope is 0 to 2 percent.

Typically, the surface layer is very pale brown silt loam about 8 inches thick. The underlying material to a depth of 60 inches or more is pink silt loam and silty clay loam.

Included in this unit are about 5 percent Aztec soils on erosional fan remnants and 5 percent Land soils on the flood plains. Included areas make up about 10 percent of the total acreage. The percentage varies from one area to another.

Permeability of this Glencarb soil is moderately slow. Available water capacity is high. Effective rooting depth is limited by a seasonal high water table that is at a depth of 3 to 5 feet from July through June. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high. This soil is subject to

occasional periods of brief, high velocity flooding from July through September. This soil is slightly affected by salts to a depth of 8 inches, and it is moderately affected below this depth.

This unit is used mainly as habitat for desert wildlife and for recreation. It is also used for urban development.

The main limitations for construction of dwellings is the hazard of flooding. Flooding can be controlled only by use of major flood control structures.

The main limitations for septic tank absorption fields are the hazard of flooding, the high water table, and the restricted permeability. Flooding can be controlled only by use of major flood control structures. Restricted permeability and the high water table increase the possibility of failure of septic tank absorption fields.

This unit is limited for roads because of low soil strength and the hazard of flooding. Roads and streets should be designed to compensate for the instability of the soil. Flooding can be controlled only by use of major flood control structures.

The main limitation for lawns and landscaping is the excess salts in the soil. Because of the content of gypsum and other salts in the soil, salt-tolerant plants should be selected. Lawn grasses, shrubs, and trees that are not sensitive to lime-induced chlorosis are well suited to use in landscaping. Annual applications of iron chelates reduce the effects of chlorosis.

This map unit is in capability subclasses IIIw, irrigated, and VIw, nonirrigated. It is in horticultural group 5.

222—Glencarb silty clay loam, wet. This very deep, well drained soil is on recent alluvial flats. The drainage has been altered by seepage. The soil formed in alluvium derived from various kinds of rock. Slope is 0 to 2 percent.

Typically, the surface layer is very pale brown silty clay loam about 6 inches thick. The underlying material to a depth of 60 inches or more is pink silt loam and silty clay loam.

Included in this unit are about 5 percent Bluepoint soils on sand sheets and 5 percent Land soils on recent alluvial flats. Included areas make up about 10 percent of the total acreage. The percentage varies from one area to another.

Permeability of this Glencarb soil is moderately slow. Available water capacity is high. Effective rooting depth is limited by a seasonal high water table that is at a depth of 3 to 5 feet from July through June. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high. This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks. This soil is slightly affected by salts to a depth of 8 inches, and it is moderately affected below this depth.

This unit is used mainly as habitat for desert wildlife and for recreation. It is also used for urban development.

The main limitation for construction of dwellings is the hazard of flooding. Dikes and channels that have outlets for floodwater can be used to protect buildings from flooding.

The main limitation for septic tank absorption fields is the high water table and the restricted permeability. Restricted permeability and the high water table increase the possibility of failure of septic tank absorption fields.

This unit is limited for roads because of low soil strength. Roads and streets should be designed to compensate for the instability of the soil.

The main limitation for lawns and landscaping is the excess salts in the soil. Because of the content of gypsum and other salts in the soil, salt-tolerant plants should be selected. Lawn grasses, shrubs, and trees that are not sensitive to lime-induced chlorosis are well suited to use in landscaping. Annual applications of iron chelates reduce the effects of chlorosis.

This map unit is in capability subclasses IIIw, irrigated, and VIw, nonirrigated. It is in horticultural group 5.

236—Glencarb very fine sandy loam, saline. This very deep, well drained soil is on recent alluvial flats. It formed in alluvium derived from various kinds of rock. Slope is 0 to 2 percent.

Typically, the surface layer is light brownish gray very fine sandy loam about 6 inches thick. The underlying material to a depth of 60 inches or more is grayish brown, stratified clay loam to very fine sandy loam and contains some crystalline gypsum. In some areas of similar included soils, the surface layer is silty clay loam.

Included in this unit on relict alluvial flats are about 5 percent McCarran soils and on recent alluvial flats 10 percent Land soils that are affected by sodium sulfate.

Permeability of this Glencarb soil is moderately slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is very slow, and the hazard of water erosion is slight. The hazard of soil blowing is high. This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks. This soil is slightly affected by salts to a depth of 6 inches, and it is moderately affected by salts below this depth.

Most areas of this unit are used for urban development. A few areas are used for irrigated cropland, desert wildlife habitat, or recreation.

The main limitation for construction of dwellings is the hazard of flooding. Dikes and channels that have outlets for floodwater can be used to protect buildings from flooding. Gypsum and other sulfates in the soil can induce electrochemical action that corrodes concrete. This limitation can be overcome by using cement that is resistant to sulfate corrosion.

The main limitation for septic tank absorption fields is the restricted permeability of the soil. Poor permeability increases the possibility of failure of septic tank absorption fields. Using long absorption lines and

backfilling the trench with sandy material help to compensate for the restricted permeability.

Channeling and deposition can be minimized and maintenance costs reduced by protecting roads from flooding. Trafficability of roads can be improved by providing a stable base and an adequate wearing surface.

The main limitation for lawns and landscaping is the excess salts in the soil. Because of the content of gypsum and other salts in the soil, salt-tolerant plants should be selected. Lawn grasses, shrubs, and trees that are not sensitive to lime-induced chlorosis are well suited to use in landscaping. Annual applications of iron chelates reduce the effects of chlorosis.

If this unit is used for irrigated crops, the main limitations are excess salts and low fertility of the soil. The content of toxic salts can be reduced by leaching and returning crop residue to the soil. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or grass-legume mixtures help to maintain fertility and tilth. Crops respond to nitrogen and phosphorus. The average yield is 6 tons per acre for alfalfa hay grown under a high level of management.

This map unit is in capability subclasses IIIs, irrigated, and VIIs, nonirrigated. It is in horticultural group 4.

237—Glencarb very fine sandy loam, hardpan substratum. This deep, well drained soil is on recent alluvial flats. It formed in alluvium derived from various kinds of rock. Slope is 0 to 2 percent.

Typically, the surface layer is pale brown very fine sandy loam about 6 inches thick. The upper 36 inches of the underlying material is very pale brown, stratified silty clay loam to silt loam, and the lower part to a depth of 60 inches or more is a strongly lime-cemented hardpan. Depth to the hardpan ranges from 40 to 60 inches or more.

Permeability of the Glencarb soil is moderately slow above the hardpan. Available water capacity is moderate. Effective rooting depth is 40 to 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high. This soil is moderately affected by salts below a depth of 6 inches. It is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks.

Most areas of this unit are used as habitat for desert wildlife and for recreation and cropland. A few areas are used for urban development.

If this unit is used for irrigated crops, the main limitations are the hazard of soil blowing, excess salts, and low fertility of the soil. Maintaining crop residue on or near the surface reduces runoff, reduces soil blowing, and helps to maintain soil tilth and organic matter content. Content of toxic salts can be reduced by leaching and returning crop residue to the soil. Crops respond to nitrogen and phosphorus. The average yield is 6 tons per acre for alfalfa hay grown under a high level of management.

The main limitation for construction of dwellings is the hazard of flooding. Dikes and channels that have outlets for floodwater can be used to protect buildings from flooding.

The main limitation for septic tank absorption fields is the restricted permeability of the soil. Poor permeability increases the possibility of failure of septic tank absorption fields. Using long absorption lines and backfilling the trench with sandy material help to compensate for the restricted permeability.

Channeling and deposition can be minimized and maintenance costs reduced by protecting roads from flooding. Trafficability of roads can be improved by providing a stable base and an adequate wearing surface.

Most climatically adapted plants can be used for lawns and landscaping.

This map unit is in capability subclasses IIIs, irrigated, and VIIs, nonirrigated. It is in horticultural group 1.

240—Goodsprings gravelly fine sandy loam, 2 to 4 percent slopes. This shallow, well drained soil is on erosional fan remnants. It formed in mixed alluvium derived mainly from limestone and sandstone.

Typically, about 90 percent of the surface is covered with a well developed desert pavement of pebbles. There is a dark desert varnish on the exposed surfaces of the rock fragments. The surface layer is light brown gravelly fine sandy loam about 5 inches thick. The upper 10 inches of the underlying material is pink gravelly fine sandy loam, the next 37 inches is a reddish brown and pinkish white, strongly lime-cemented hardpan, and the lower part to a depth of 60 inches or more is pink extremely gravelly loamy fine sand. Depth to the hardpan ranges from 9 to 20 inches.

Included in this unit is about 5 percent Jean soils, flooded, in channels.

Permeability of the Goodsprings soil is moderate above the hardpan. Available water capacity is very low. Effective rooting depth is 9 to 20 inches. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is high if the desert pavement is disturbed.

This unit is used mainly as habitat for desert wildlife and for recreation. It is also used for urban development.

The main limitation for construction of dwellings is the limited depth to the hardpan. Heavy equipment is needed for excavation.

The main limitation for septic tank absorption fields is the limited depth to the hardpan. Excavation is limited by the hardpan. Special design of septic tank absorption fields is needed.

This unit is limited for roads because of the limited depth to the hardpan. Roads should be designed to

minimize cuts. Heavy equipment is needed for excavation.

The main limitation for lawns and landscaping is the limited depth to the hardpan. It is difficult to establish plants in areas where the pan is exposed. Mulching and fertilizing cut areas help to establish plants. Lawn grasses, shrubs, and trees that are not sensitive to lime-induced chlorosis are well suited to use in landscaping. Annual applications of iron chelates reduce the effects of chlorosis.

Intermittent streams form the drainageways in this unit. These drainageways are subject to rare or occasional periods of high-velocity flooding. Care should be exercised during urbanization to accommodate runoff from the drainageways. If drains become plugged during a major flood, accelerated erosion and damage to roads, buildings, and other structures can occur.

This map unit is in capability subclass VIIs, nonirrigated. It is in horticultural group 6.

252—Grapevine very fine sandy loam, 0 to 2 percent slopes. This very deep, well drained soil is on relict alluvial flats. It formed in alluvium derived from various kinds of rock.

Typically, about 10 percent of the surface is covered with a desert pavement of pebbles. The surface layer is pink very fine sandy loam about 1 inch thick. The upper 29 inches of the underlying material is pink and pinkish white fine sandy loam, the next 20 inches or more is pink very fine sandy loam, and the lower part to a depth of 54 inches is stratified, pink very fine sandy loam and reddish yellow fine sandy loam and has a few gypsum masses. The next layer to a depth of 69 inches or more is pink loam that has common gypsum masses. About 90 acres of this unit, 1 mile west of McCarran Airport, is strongly dissected and has a slope of 4 to 8 percent.

Included in this unit is about 5 percent Las Vegas soils on slightly higher relict alluvial flats.

Permeability of this Grapevine soil is moderate. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high. This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks. The soil is slightly affected by salts below a depth of 5 inches.

This unit is used mainly as habitat for desert wildlife and for recreation. It is also used for urban development.

The main limitation for construction of dwellings is the hazard of flooding. Dikes and channels that have outlets for floodwater can be used to protect buildings from flooding. Gypsum in the soil can induce electrochemical action that corrodes concrete. This limitation can be overcome by using cement that is resistant to sulfate corrosion.

Dikes and channels that have outlets for floodwater can be used to protect onsite sewage disposal systems from flooding. If the Grapevine soil is used for septic tank absorption fields, the limitation of restricted permeability can be overcome by increasing the size of the absorption field.

Channeling and deposition can be minimized and maintenance costs reduced by protecting roads from flooding.

The main limitation for lawns and landscaping is the excess salts in the soil. Salts can be flushed out by using heavy periodic applications of water. Because of the content of gypsum and other salts in the soil, salt-tolerant plants should be selected. Lawn grasses, shrubs, and trees that are not sensitive to lime-induced chlorosis are well suited to use in landscaping. Annual applications of iron chelates reduce the effects of chlorosis.

This map unit is in capability subclasses IIs, irrigated, and VIIc, nonirrigated. It is in horticultural group 2.

255—Grapevine loamy fine sand, 2 to 4 percent slopes. This very deep, well drained soil is on relict alluvial flats and basin floor remnants. It formed in alluvium derived from various kinds of rock.

Typically, about 50 percent of the surface is covered with a desert pavement of small pebbles and hardpan fragments. The surface layer is reddish yellow loamy fine sand about 10 inches thick. The underlying material to a depth of 60 inches or more is pink, stratified fine sandy loam to clay loam.

Included in this unit are about 5 percent Las Vegas soils on the slightly higher basin floor remnants and 5 percent McCarran soils on the relict alluvial flats. Included areas make up about 10 percent of the total acreage. The percentage varies from one area to another.

Permeability of this Grapevine soil is moderate. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high. This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks. The soil is slightly affected by salts below a depth of 10 inches.

This unit is used mainly for urban development. It is also used as habitat for desert wildlife and for recreation.

The main limitation for construction of dwellings is the hazard of flooding. Dikes and channels that have outlets for floodwater can be used to protect buildings from flooding. Gypsum in the soil can induce electrochemical action that corrodes concrete. This limitation can be overcome by using cement that is resistant to sulfate corrosion.

Dikes and channels that have outlets for floodwater can be used to protect onsite sewage disposal systems from flooding. If the Grapevine soil is used for septic tank absorption fields, the limitation of restricted

permeability can be overcome by increasing the size of the absorption field

Channeling and deposition can be minimized and maintenance costs reduced by protecting roads from flooding

The main limitation for lawns and landscaping is the excess salts in the soil. Salts can be flushed out by using heavy periodic applications of water. Because of the content of gypsum and other salts in the soil, salt-tolerant plants should be selected. Lawn grasses, shrubs, and trees that are not sensitive to lime-induced chlorosis are well suited to use in landscaping. Annual applications of iron chelates reduce the effects of chlorosis.

This map unit is in capability subclasses IIs, irrigated and VIIs, nonirrigated. It is in horticultural group 2

260—Jean gravelly loamy fine sand, 2 to 4 percent slopes. This very deep, excessively drained soil is on inset fans. It formed in alluvium derived from various kinds of rock

Typically, about 40 percent of the surface is covered with a desert pavement of pebbles and a few cobbles. There is a dark desert varnish on the exposed surfaces of the rock fragments. The surface layer is pink gravelly loamy fine sand about 1 inch thick. The upper part of the underlying material is light reddish brown loamy fine sand about 7 inches thick, the next 10 inches or more is pink loamy fine sand, and the lower part to a depth of 60 inches or more is pink, stratified very gravelly loamy fine sand to extremely gravelly sand.

Included in this unit is about 5 percent Goodsprings soils on erosional fan remnants. The percentage varies from one area to another

Permeability of this Jean soil is rapid. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high. This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks.

This unit is used mainly as habitat for desert wildlife and for recreation. It is also used for urban development

The main limitation for construction of dwellings is the hazard of flooding. Dikes and channels that have outlets for floodwater can be used to protect buildings from flooding. Excavating in areas of the Jean soil can expose material that is highly susceptible to soil blowing.

The main limitation for septic tank absorption fields is inadequate filtration of effluent. Because the substratum is highly permeable, special design may be needed to avoid polluting ground water and nearby water supplies. If the density of housing is moderate to high, community sewage systems are needed to prevent contamination of water supplies as a result of seepage from onsite sewage disposal systems.

Channeling and deposition can be minimized and maintenance costs reduced by protecting roads from flooding. Unless an adequate wearing surface is maintained, stones and cobbles in the soil create road hazards and increase maintenance costs

The main limitation for lawns and landscaping is the very low available water capacity of the soil. Frequent irrigation of lawns, gardens, and most other plantings is needed because of the limited available water capacity of the soil

This map unit is in capability subclasses IVs, irrigated and VIIs, nonirrigated. It is in horticultural group 3.

262—Jean-Goodsprings complex, 2 to 4 percent slopes. This map unit is on fan piedmonts

This unit is 50 percent Jean gravelly loamy fine sand, 2 to 4 percent slopes, 25 percent Jean very gravelly loamy fine sand, flooded, 2 to 4 percent slopes, and 25 percent Goodsprings gravelly fine sandy loam, 2 to 4 percent slopes. The Jean gravelly loamy fine sand is on inset fans; the Jean, flooded, soil is in channels; and the Goodsprings soil is on erosional fan remnants. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used

The Jean gravelly loamy fine sand is very deep and excessively drained. It formed in alluvium derived from various kinds of rock. Typically, about 75 percent of the surface is covered with a desert pavement of pebbles and cobbles. There is a dark desert varnish on the exposed surfaces of the rock fragments. The surface layer is pink gravelly loamy fine sand about 2 inches thick. The upper 10 inches of the underlying material is light reddish brown loamy fine sand, and the lower part to a depth of 60 inches or more is pink, stratified extremely gravelly sand to very gravelly loamy fine sand.

Permeability of this Jean soil is rapid. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high if the surface is disturbed. This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks

The Jean very gravelly loamy fine sand, flooded, is very deep and excessively drained. It formed in alluvium derived from various kinds of rock. Typically, about 60 percent of the surface is covered with a desert pavement of pebbles and cobbles. The surface layer is pink very gravelly loamy fine sand about 1 inch thick. The upper 10 inches of the underlying material is light reddish brown loamy fine sand, and the lower part to a depth of 60 inches or more is pink, stratified gravelly fine sand to very gravelly loamy fine sand.

Permeability of this Jean soil is rapid. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion

is slight. The hazard of soil blowing is high if the surface is disturbed. This soil is subject to occasional periods of very brief, high-velocity floods from June through September.

The Goodsprings soil is shallow and well drained. It formed in mixed alluvium derived dominantly from limestone and sandstone. Typically, about 80 percent of the surface is covered with a desert pavement of pebbles and cobbles. There is a dark desert varnish on the exposed surfaces of the rock fragments. The surface layer is pink gravelly fine sandy loam about 5 inches thick. The upper 10 inches of the underlying material is pink gravelly fine sandy loam, the next 37 inches is a pinkish white, strongly lime-cemented hardpan, and the lower part to a depth of 60 inches or more is pink extremely gravelly loamy fine sand. Depth to the hardpan ranges from 9 to 20 inches.

Permeability of the Goodsprings soil is moderate above the hardpan. Available water capacity is very low. Effective rooting depth is 9 to 20 inches. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high if the surface is disturbed. This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks.

This unit is used mainly as habitat for desert wildlife and for recreation. It is also used for urban development.

The main limitations for construction of dwellings are the hazard of flooding and the depth to the hardpan in areas of the Goodsprings soil. Flooding can be controlled only by use of major flood control structures. Excavation for building sites is limited by the hardpan. Heavy equipment is needed. Excavating in areas of the Jean soils can expose material that is highly susceptible to soil blowing.

The main limitations for septic tank absorption fields are inadequate filtration of effluent, the hazard of flooding in areas of the Jean very gravelly loamy fine sand, and the limited depth to the hardpan in areas of the Goodsprings soil. Because the substratum is highly permeable, special design may be needed to avoid polluting ground water and nearby water supplies. If the density of housing is moderate to high, community sewage systems are needed to prevent contamination of water supplies as a result of seepage from onsite sewage disposal systems. Dikes and channels that have outlets for floodwater can be used to protect onsite sewage disposal systems from flooding. Excavation is limited by the hardpan. Heavy equipment is needed.

This unit is limited for roads because of the hazard of flooding in areas of the Jean very gravelly loamy fine sand and the limited depth to the hardpan in areas of the Goodsprings soil. Flooding can be controlled only by use of major flood control structures. Roads should be designed to minimize cuts.

The main limitations for lawns and landscaping are the very low available water capacity of the Jean soils, the desert pavement on the Jean very gravelly loamy fine sand, and the limited depth to the hardpan in areas of the Goodsprings soil. Frequent irrigation of lawns, gardens, and most other plantings is needed because of the limited available water capacity. Removing the desert pavement is necessary for best results when landscaping, particularly in areas used for lawns. It is difficult to establish plants in areas where the pan is exposed. Mulching and fertilizing cut areas help to establish plants. Lawn grasses, shrubs, and trees that are not sensitive to lime-induced chlorosis are well suited to use in landscaping. Annual applications of iron chelates reduce the effects of chlorosis.

This map unit is in capability subclasses IVs, irrigated, and VIIs, nonirrigated. The Jean soils are in horticultural group 3, and the Goodsprings soil is in horticultural group 6.

263—Jean complex, 2 to 4 percent slopes. This map unit is on inset fans.

This unit is 55 percent Jean gravelly loamy fine sand, 2 to 4 percent slopes, and 40 percent Jean very gravelly loamy fine sand, flooded, 2 to 4 percent slopes. The Jean gravelly loamy fine sand is on inset fans, and the Jean, flooded, soil is in channels. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 5 percent Goodsprings soils on erosional fan remnants.

The Jean gravelly loamy fine sand is very deep and excessively drained. It formed in mixed alluvium derived dominantly from limestone, quartzite, and sandstone. Typically, about 50 percent of the surface is covered with a desert pavement of pebbles and cobbles. There is a dark desert varnish on the exposed surfaces of the rock fragments. The surface layer is pink gravelly loamy fine sand about 1 inch thick. The upper 10 inches of the underlying material is light reddish brown loamy fine sand, and the lower part to a depth of 60 inches or more is pink, stratified extremely gravelly sand to very gravelly loamy fine sand.

Permeability of this Jean soil is rapid. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high if the surface is disturbed. This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks.

The Jean very gravelly loamy fine sand, flooded, is very deep and excessively drained. It formed in mixed alluvium derived dominantly from limestone, quartzite, and sandstone. Typically, about 60 percent of the surface is covered with a desert pavement of pebbles and cobbles. The surface layer is pink very gravelly loamy fine sand about 1 inch thick. The upper 10 inches of the underlying material is light reddish brown loamy

fine sand, and the lower part to a depth of 60 inches or more is pink, stratified extremely gravelly fine sand to very gravelly loamy fine sand.

Permeability of this Jean soil is rapid. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high if the surface is disturbed. This soil is subject to occasional periods of very brief, high-velocity flooding from June through September.

This unit is used mainly as habitat for desert wildlife and for recreation. It is also used for urban development.

The main limitation for construction of dwellings is the hazard of flooding. Flooding can be controlled only by use of major flood control structures. Excavating in areas of the Jean soils can expose material that is highly susceptible to soil blowing.

The main limitations for septic tank absorption fields are inadequate filtration of effluent and the hazard of flooding in areas of the Jean, flooded, soil. Because the substratum is highly permeable, special design may be needed to avoid polluting ground water and nearby water supplies. If the density of housing is moderate to high, community sewage systems are needed to prevent contamination of water supplies as a result of seepage from onsite sewage disposal systems. Dikes and channels that have outlets for floodwater can be used to protect onsite sewage disposal systems from flooding.

The Jean, flooded, soil is limited for roads because of the hazard of flooding. Flooding can be controlled only by use of major flood control structures.

The main limitations for lawns and landscaping are the very low available water capacity and the desert pavement on the Jean, flooded, soil. Frequent irrigation of lawns, gardens, and most other plantings is needed because of the limited available water capacity of the soil. Removing the desert pavement is necessary for best results when landscaping, particularly in areas used for lawns.

This map unit is in capability subclasses IVw, irrigated, and VIIw, nonirrigated. It is in horticultural group 3.

264—Jean very gravelly loamy fine sand, 2 to 4 percent slopes. This very deep, excessively drained soil is on inset fans. It formed in alluvium derived from various kinds of rock.

Typically, about 60 percent of the surface is covered with a desert pavement of pebbles. The surface layer is pink very gravelly loamy fine sand about 1 inch thick. The upper 17 inches of the underlying material is light reddish brown loamy fine sand, and the lower part to a depth of 60 inches or more is pink, stratified extremely gravelly sand to very gravelly loamy fine sand.

Permeability of this Jean soil is rapid. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high if the surface is disturbed. This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks.

This unit is used mainly as habitat for desert wildlife and for recreation. It is also used for urban development.

The main limitation for construction of dwellings is the hazard of flooding. Dikes and channels that have outlets for floodwater can be used to protect buildings from flooding. Excavating in areas of the Jean soil can expose material that is highly susceptible to soil blowing.

The main limitation for septic tank absorption fields is inadequate filtration of effluent. Because the substratum is highly permeable, special design may be needed to avoid polluting ground water and nearby water supplies. If the density of housing is moderate to high, community sewage systems are needed to prevent contamination of water supplies as a result of seepage from onsite sewage disposal systems.

Channeling and deposition can be minimized and maintenance costs reduced by protecting roads from flooding. Unless an adequate wearing surface is maintained, stones and cobbles in the soil create road hazards and increase maintenance costs.

The main limitations for lawns and landscaping are the desert pavement and the very low available water capacity. Removing the desert pavement is necessary for best results when landscaping, particularly in areas used for lawns. Frequent irrigation of lawns, gardens, and most other plantings is needed because of the limited available water capacity of the soil.

This map unit is in capability subclasses IVs, irrigated, and VIIs, nonirrigated. It is in horticultural group 3.

270—Land silt loam, drained. This very deep, somewhat poorly drained soil is on recent alluvial flats. The drainage has been artificially altered. The soil formed in alluvium derived from various kinds of rock. Slope is 0 to 2 percent.

Typically, the surface layer is pink silt loam that is high in soluble salts and is about 6 inches thick. The underlying material to a depth of 60 inches or more is pink, stratified silty clay to silt loam and is high in soluble salts.

Included in this unit are about 5 percent Glencarb soils on recent alluvial flats and 5 percent McCarran soils on relict alluvial flats. Included areas make up about 10 percent of the total acreage. The percentage varies from one area to another.

Permeability of this Land soil is moderately slow. Available water capacity is high. Effective rooting depth is limited by a seasonal high water table that is at a depth of 3.5 to 6.0 feet from March through September. Runoff is very slow, and the hazard of water erosion is slight. The hazard of soil blowing is high. This soil is subject to rare periods of flooding during prolonged high-intensity storms. Channeling and deposition are

common along streambanks. This soil is strongly affected by salts.

This unit is used mainly as habitat for desert wildlife and for recreation. It is also used for urban development and irrigated hay.

Some areas of this unit may be subject to salt heaving because of the expansion of sodium sulfate salts. This action may cause concrete slab floors, driveways, and sidewalks to crack. Removal of the sodium sulfate salts by mechanical means, deep leaching, or chemical treatment can alleviate this problem.

The main limitation for construction of dwellings is the hazard of flooding. Dikes and channels that have outlets for floodwater can be used to protect buildings from flooding. Sodium sulfate in the soil can induce electrochemical action that corrodes concrete. This limitation can be overcome by using cement that is resistant to sulfate corrosion.

The main limitation for septic tank absorption fields is the restricted permeability of the soil. Using long absorption lines and backfilling the trench with sandy material help to compensate for the restricted permeability.

This unit is limited for roads because of the limited ability of the soil to support a load and the presence of sodium sulfate salts. Roads and streets should be designed to compensate for the instability of the soil. Local roads and streets may require a special base to avoid damage from the expansion of sodium sulfate salts.

The main limitation for lawns and landscaping is excessive salts in the soil. Because of the content of sodium sulfate and other salts in the soil, salt-tolerant plants should be selected.

If this unit is used for irrigated hay, pasture, or other crops, the main limitations are excessive salts in the soil and low soil fertility. Intensive management is required to reduce the salinity and maintain soil productivity. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or grass-legume mixtures help to maintain fertility and tilth. Content of toxic salts is reduced by leaching and returning crop residue to the soil. Tile drainage can be used to maintain or lower the level of the water table if a suitable outlet is available. Crops respond to nitrogen and phosphorus. The average yield is 5 tons per acre for alfalfa hay grown under a high level of management.

This map unit is in capability subclasses VIw, irrigated, and VIIw, nonirrigated. It is in horticultural group 5.

279—Land very fine sandy loam, wet. This very deep, somewhat poorly drained soil is on recent alluvial flats. The drainage has been altered by seepage in the area. The soil formed in mixed alluvium derived dominantly from limestone, gypsum, quartzite, and sandstone and undifferentiated volcanic and sedimentary rock. Slope is 0 to 2 percent.

Typically, the surface layer is light yellowish brown very fine sandy loam about 2 inches thick. The upper 8 inches of the underlying material is pinkish gray gravelly sandy loam, and the lower part to a depth of 60 inches or more is light brown or brown silt loam and silty clay loam and is high in soluble salts.

Included in this unit is about 5 percent Glencarb soils on the recent alluvial flats.

Permeability of this Land soil is moderately slow. Available water capacity is high. Effective rooting depth is limited by a seasonal high water table that is at a depth of 1.5 to 3 feet from January through December. Runoff is very slow, and the hazard of water erosion is slight. The hazard of soil blowing is high. This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks. This soil is moderately affected by salts to a depth of 2 inches, and it is strongly affected by salts below this depth.

This unit is used as habitat for desert wildlife and for recreation.

This unit is limited for roads because of the limited ability of the soil to support a load and because of the content of sodium sulfate salts. Roads and streets should be designed to compensate for the instability of the soil. Local roads and streets may require a special base to avoid damage from the expansion of sodium sulfate salts. Sodium sulfate in the soil can induce electrochemical action that corrodes concrete. This limitation can be overcome by using cement that is resistant to sulfate corrosion.

This map unit is in capability subclasses VIw, irrigated, and VIIw, nonirrigated. It is in horticultural group 5.

282—Land silty clay loam. This very deep, somewhat poorly drained soil is on recent alluvial flats. It formed in alluvium derived from various kinds of rock. Slope is 0 to 2 percent.

Typically, the surface layer is very pale brown silty clay loam about 2 inches thick. The upper 5 inches of the underlying material is pale brown silt loam, the next 3 inches is pale brown loam, and the lower part to a depth of 64 inches is pale brown to light yellowish brown silty clay loam that is high in soluble salts. In some areas of similar included soils, the surface layer is silt loam.

Included in this unit are about 5 percent Glencarb soils, slightly wet, saline, 5 percent McCarran soils, and 5 percent Spring soils on alluvial flats. Included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

Permeability of this Land soil is moderately slow. Available water capacity is high. Effective rooting depth is limited by a seasonal high water table that is at a depth of 3 to 5 feet from January through December. Runoff is very slow, and the hazard of water erosion is slight. The hazard of soil blowing is high. This soil is subject to rare periods of flooding during prolonged,

high-intensity storms. Channeling and deposition are common along streambanks. This soil is strongly affected by salts.

This unit is used mainly as habitat for desert wildlife and for recreation. It is also used for urban development.

The main limitation for construction of dwellings is the hazard of flooding. Dikes and channels that have outlets for floodwater can be used to protect buildings from flooding. Some areas of this unit may be subject to salt heaving because of the expansion of sodium sulfate salts. This action may cause concrete slab floors, driveways, and sidewalks to crack. Removal of the sodium sulfate salts by mechanical means, deep leaching, or chemical treatment can alleviate this problem. Sodium sulfate in the soil can induce electrochemical action that corrodes concrete. This limitation can be overcome by using cement that is resistant to sulfate corrosion.

The main limitation for septic tank absorption fields is restricted permeability of the soil. Using long absorption lines and backfilling the trench with sandy material help to compensate for the restricted permeability.

This unit is limited for roads because of limited ability of the soil to support a load and because of the presence of sodium sulfate salts. Roads and streets should be designed to compensate for the instability of the soil. Local roads and streets may require a special base to avoid damage from the expansion of sodium sulfate salts.

The main limitations for lawns and landscaping are excessive soluble salts in the soil. Because of the content of sodium sulfate and other salts in the soil, salt-tolerant plants should be selected. Content of toxic salts can be reduced by leaching, applying proper amounts of soil amendments, and returning crop residue to the soil.

This map unit is in capability subclasses VIw, irrigated, and VIIw, nonirrigated. It is in horticultural group 5.

300—Las Vegas gravelly fine sandy loam, 0 to 2 percent slopes. This shallow, well drained soil is on basin floor remnants. It formed in alluvium derived dominantly from limestone and dolomite.

Typically, about 25 percent of the surface is covered with a desert pavement of hardpan fragments and pebbles. The surface layer is very pale brown gravelly fine sandy loam about 1 inch thick. The upper 6 inches of the underlying material is very pale brown fine sandy loam, and the next 4 inches is very pale brown gravelly sandy clay loam. A white, indurated, lime-cemented hardpan is at a depth of about 11 inches. Depth to the hardpan ranges from 3 to 14 inches.

Included in this unit are about 5 percent Destazo soils, 0 to 4 percent slopes, and 5 percent Grapevine soils, 0 to 4 percent slopes, on erosional fan remnants. Included areas make up about 10 percent of the total acreage. The percentage varies from one area to another.

Permeability of the Las Vegas soil is moderately slow above the hardpan. Available water capacity is very low. Effective rooting depth is 3 to 14 inches. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high. This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks.

This unit is used mainly as habitat for desert wildlife and for recreation. It is also used for urban development.

The main limitations for construction of dwellings are the hazard of flooding and the limited depth to the hardpan. Dikes and channels that have outlets for floodwater can be used to protect buildings from flooding. Excavation for building sites is limited by the hardpan. Heavy equipment is needed for excavation.

The main limitation for septic tank absorption fields is the limited depth to the hardpan. Special design of septic tank absorption fields is needed. Excavation is limited by the hardpan. Heavy equipment is needed for excavation.

This unit is limited for roads because of the limited depth to the hardpan. Roads should be designed to minimize cuts. Heavy equipment is needed for excavation.

The main limitation for lawns and landscaping is the limited depth to the hardpan. It is difficult to establish plants in areas where the pan is exposed. Mulching and fertilizing cut areas help to establish plants. Lawn grasses, shrubs, and trees that are not sensitive to lime-induced chlorosis are well suited to use in landscaping. Annual applications of iron chelates reduce the effects of chlorosis.

This map unit is in capability subclass VIIs, nonirrigated, and in horticultural group 6.

301—Las Vegas gravelly fine sandy loam, 2 to 4 percent slopes. This shallow, well drained soil is on deeply dissected basin floor remnants. It formed in alluvium derived dominantly from limestone and dolomite.

Typically, about 30 percent of the surface is covered with a desert pavement of hardpan fragments and pebbles. The surface layer is very pale brown gravelly fine sandy loam about 1 inch thick. The upper 6 inches of the underlying material is very pale brown fine sandy loam, and the next 4 inches is very pale brown gravelly sandy clay loam. A white, indurated, lime-cemented hardpan is at a depth of about 11 inches. Depth to the hardpan ranges from 3 to 14 inches.

Included in this unit is about 5 percent Destazo soils, 8 to 15 percent slopes, on side slopes of erosional fan remnants.

Permeability of the Las Vegas soil is moderately slow above the hardpan. Available water capacity is very low. Effective rooting depth is 3 to 14 inches. Runoff is slow and the hazard of water erosion is slight. The hazard of soil blowing is high. This soil is subject to rare periods of

flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks.

This unit is used as habitat for desert wildlife and for recreation.

This unit is limited for roads because of the depth to an indurated hardpan and the dendritic pattern of straight-walled channels that are 5 to 20 feet deep. Roads should be designed to minimize cuts. Heavy equipment is needed for excavation. Roads that cross the deep channels require bridging or deep cuts and fills and large culverts.

This map unit is in capability subclass VIIs, nonirrigated, and in horticultural group 6.

302—Las Vegas-McCarran-Grapevine complex, 0 to 4 percent slopes. This map unit is on basin floor remnants.

This unit is 40 percent Las Vegas gravelly fine sandy loam, 0 to 4 percent slopes, 25 percent McCarran fine sandy loam, 0 to 4 percent slopes, eroded; and 20 percent Grapevine very fine sandy loam, 0 to 4 percent slopes. The Las Vegas soil is on summits, the McCarran soil is on foot slopes, and the Grapevine soil is on shoulders of basin floor remnants. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are about 5 percent areas of Badland; 5 percent Bluepoint soils on small sand sheets, and 5 percent Bracken soils on pediment remnants. Included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

The Las Vegas soil is shallow and well drained. It formed in alluvium derived from limestone and lacustrine sediment. Typically, the surface layer is very pale brown gravelly fine sandy loam about 1 inch thick. The upper 6 inches of the underlying material is very pale brown fine sandy loam, and the next 4 inches is very pale brown gravelly sandy clay loam. A white, indurated, lime-cemented hardpan is at a depth of about 11 inches. Depth to the hardpan ranges from 3 to 14 inches.

Permeability of the Las Vegas soil is moderately slow above the hardpan. Available water capacity is very low. Effective rooting depth is 3 to 14 inches. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high. This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks.

The McCarran soil is very deep and well drained. It formed in alluvium derived from limestone, sandstone, and gypsiferous sediment. Typically, the surface layer is pink fine sandy loam about 5 inches thick. The underlying material is pink sandy loam and loam to a depth of 60 inches. Most of the subsurface layers are weakly cemented with lime and gypsum.

Permeability of the McCarran soil is moderately slow. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high. This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks. This soil is slightly affected by salts to a depth of 5 inches, and it is moderately affected by salts below this depth.

The Grapevine soil is very deep and well drained. It formed in alluvium derived from various kinds of rock that have a high content of gypsiferous material. Typically, the surface layer is pink very fine sandy loam about 10 inches thick. The underlying material to a depth of 60 inches or more is pink, stratified fine sandy loam to clay loam.

Permeability of the Grapevine soil is moderate. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high. This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks. The soil is slightly affected by salts below a depth of 10 inches.

This unit is used mainly as habitat for desert wildlife and for recreation. It is also used for urban development.

The main limitations for construction of dwellings are the hazard of flooding on all soils and the depth to the hardpan in the Las Vegas soil. Dikes and channels that have outlets for floodwater can be used to protect buildings from flooding. Excavation for building sites is limited by the hardpan. Heavy equipment is needed for excavation. Gypsum in the McCarran and Grapevine soils can induce electrochemical action that corrodes concrete. This limitation can be overcome by using cement that is resistant to sulfate corrosion. Subsidence caused by the dissolution of gypsum in the McCarran soil can be prevented by using foundation drains, gutters, and downspouts that discharge directly into the sewer system.

The main limitations for septic tank absorption fields are depth to the hardpan in the Las Vegas soil and the restricted permeability of the McCarran soil. Excavation is limited by the hardpan. Special design of septic tank absorption fields is needed. Using long absorption lines and backfilling the trench with sandy material help to compensate for the restricted permeability.

The Las Vegas soil is limited for roads because of the depth to the hardpan. Roads should be designed to minimize cuts. Heavy equipment is needed for excavation.

The main limitations for lawns and landscaping are depth to the hardpan in the Las Vegas soil and excess soluble salts in the McCarran soil. It is difficult to establish plants in areas where the pan is exposed. Mulching and fertilizing cut areas help to establish

plants. Because of the content of gypsum and other salts in the soil, salt-tolerant plants should be selected. Excessive irrigation can dissolve gypsum in the soil and cause subsidence. Lawn grasses, shrubs, and trees that are not sensitive to lime-induced chlorosis are well suited to use in landscaping. Annual applications of iron chelates reduce the effects of chlorosis.

This map unit is in capability subclass VIIs, nonirrigated. The Las Vegas soil is in horticultural group 6, the McCarran soil is in horticultural group 4, and the Grapevine soil is in horticultural group 2.

305—Las Vegas-Destazo complex, 0 to 2 percent slopes. This map unit is on relict alluvial flats.

This unit is 60 percent Las Vegas gravelly fine sandy loam, 0 to 2 percent slopes, and 25 percent Destazo fine sandy loam, 0 to 2 percent slopes. These soils are in a random pattern on a relict surface and are topographically indistinguishable. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are about 5 percent Bluepoint soils on small sand sheets, 5 percent Glencarb soils on recent alluvial flats, and 5 percent Skyhaven soils on the relict alluvial flats. Included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

The Las Vegas soil is shallow and well drained. It formed in alluvium derived dominantly from limestone, dolomite, and some lacustrine sediment that has a high content of lime. Typically, about 25 percent of the surface is covered with a desert pavement of hardpan fragments and pebbles. The surface layer is very pale brown gravelly fine sandy loam about 2 inches thick. The upper 6 inches of the underlying material is very pale brown fine sandy loam, and the next 4 inches is very pale brown gravelly sandy clay loam and gravelly loam. An indurated, lime-cemented hardpan is at a depth of about 12 inches. Depth to the hardpan ranges from 3 to 14 inches.

Permeability of the Las Vegas soil is moderately slow above the hardpan. Available water capacity is very low. Effective rooting depth is 3 to 14 inches. Runoff is slow and the hazard of water erosion is slight. The hazard of soil blowing is high. This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks.

The Destazo soil is very deep and well drained. It formed in alluvium derived dominantly from limestone, dolomite, and sediment that has a high content of lime. Typically, about 25 percent of the surface is covered with a desert pavement of pebbles and lime nodules. The surface layer is very pale brown fine sandy loam about 11 inches thick. The upper 40 inches of the underlying material is stratified very pale brown to white very gravelly to extremely gravelly sandy clay loam, averaging very gravelly sandy clay loam, and the lower part to a depth of 62 inches is light brown sandy loam.

Permeability of the Destazo soil is moderately slow. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high. This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks.

This unit is used mainly as habitat for desert wildlife and for recreation. It is also used for urban development.

The main limitations for construction of dwellings are the hazard of flooding and the limited depth to the hardpan in the Las Vegas soil. Dikes and channels that have outlets for floodwater can be used to protect buildings from flooding. Excavation for building sites is limited by the hardpan. Heavy equipment is needed for excavation.

The main limitations for septic tank absorption fields are the limited depth to the hardpan in the Las Vegas soil and the restricted permeability of the Destazo soil. Special design of septic tank absorption fields is needed. Heavy equipment is needed for excavation. Using long absorption lines and backfilling the trench with sandy material help to compensate for the restricted permeability.

This unit is limited for roads because of the limited depth to the hardpan in the Las Vegas soil. Roads should be designed to minimize cuts. Heavy equipment is needed for excavation.

The main limitations for lawns and landscaping are the limited depth to the hardpan in the Las Vegas soil and the moderate available water capacity of the Destazo soil. It is difficult to establish plants in areas where the pan is exposed. Mulching and fertilizing cut areas help to establish plants. Frequent irrigation of lawns, gardens, and most other plantings is needed because of the limited available water capacity of the soil. Lawn grasses, shrubs, and trees that are not sensitive to lime-induced chlorosis are well suited to use in landscaping. Annual applications of iron chelates reduce the effects of chlorosis.

This map unit is in capability subclass VIIs, nonirrigated. The Las Vegas soil is in horticultural group 6, and the Destazo soil is in horticultural group 2.

307—Las Vegas-Skyhaven complex, 0 to 4 percent slopes. This map unit is on relict alluvial flats.

This unit is 60 percent Las Vegas gravelly fine sandy loam, 0 to 4 percent slopes, and 30 percent Skyhaven very fine sandy loam, 0 to 4 percent slopes. The Las Vegas and Skyhaven soils are in a random pattern on relict alluvial flats and are topographically indistinguishable. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are about 10 percent Weiser soils, 2 to 8 percent slopes, on erosional fan remnants.

The Las Vegas soil is shallow and well drained. It formed in alluvium derived dominantly from limestone, dolomite, and lacustrine sediment that has a high content of lime. Typically, about 25 percent of the surface is covered with a desert pavement of pebbles and hardpan fragments. The surface layer is very pale brown gravelly fine sandy loam about 1 inch thick. The upper 6 inches of the underlying material is very pale brown fine sandy loam, and the next 4 inches is very pale brown gravelly sandy clay loam. A white, indurated, lime-cemented hardpan is at a depth of about 11 inches. Depth to the hardpan ranges from 3 to 14 inches.

Permeability of the Las Vegas soil is moderately slow above the hardpan. Available water capacity is very low. Effective rooting depth is 3 to 14 inches. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high. This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks.

The Skyhaven soil is moderately deep and well drained. It formed in alluvium derived dominantly from limestone, dolomite, and other rock that has a high content of lime. Typically, about 20 percent of the surface is covered with a desert pavement of pebbles and hardpan fragments. The surface layer is pink very fine sandy loam about 1 inch thick. The subsoil is light brown clay loam about 7 inches thick. The upper 29 inches of the underlying material is white gravelly loam and gravelly clay loam, and the lower part to a depth of 60 inches or more is an indurated, lime-cemented hardpan. Depth to the hardpan ranges from 24 to 40 inches.

Permeability of this Skyhaven soil is moderately slow above the hardpan. Available water capacity is moderate. Effective rooting depth is 24 to 40 inches. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high. This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks. This soil is slightly affected by salts to a depth of 8 inches, and it is moderately affected by salts below this depth.

This unit is used as habitat for desert wildlife and for recreation.

This unit is limited for roads because of the depth to an indurated hardpan in the Las Vegas soil. Roads should be designed to minimize cuts. Heavy equipment is needed for excavation. Gypsum in the Skyhaven soil can induce electrochemical action that corrodes concrete. This limitation can be overcome by using cement that is resistant to sulfate corrosion.

This map unit is in capability subclass VIIs, nonirrigated, and in horticultural group 6.

325—McCarran fine sandy loam, 0 to 4 percent slopes. This very deep, well drained soil is on relict alluvial flats. It formed in alluvium derived dominantly from limestone and lacustrine sediment that has a high content of gypsum.

Typically, about 20 percent of the surface is covered with a desert pavement of pebbles. The upper 4 inches of the soil is very pale brown and pink fine sandy loam. The next 5 inches is pink gravelly fine sandy loam. The average texture of the top 9 inches is fine sandy loam. The next layer to a depth of 48 inches is pinkish white or pink sandy loam. The lower part to a depth of 62 inches or more is pinkish white gravelly loam that is weakly cemented with gypsum and lime. In some areas of similar included soils, the surface layer is clay loam.

Included in this unit are about 5 percent Bluepoint soils on small sand sheets, 5 percent Bracken soils on pediment remnants, and 5 percent Las Vegas soils on relict alluvial flats. Also included are small areas of McCarran soils that have a hardpan at a depth of 40 to 60 inches or more. Included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

Permeability of this McCarran soil is moderately slow. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high. This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks. This soil is slightly affected by salts to a depth of 9 inches, and it is moderately affected below this depth.

Most areas of this unit are used for urban development, desert wildlife habitat, and recreation. A few areas are used for irrigated agriculture.

The main limitations for construction of dwellings are the hazard of flooding and the gypsum in the soil. Dikes and channels that have outlets for floodwater can be used to protect buildings from flooding. Application of excess water may dissolve enough gypsum in the soil to cause subsidence. Subsidence caused by the dissolution of gypsum in the McCarran soil can be prevented by using foundation drains, gutters, and downspouts that discharge directly into the sewer system. Gypsum in the soil can induce electrochemical action that corrodes concrete. This limitation can be overcome by using cement that is resistant to sulfate corrosion.

The main limitation for septic tank absorption fields is restricted permeability of the soil. Using long absorption lines and backfilling the trench with sandy material help to compensate for the restricted permeability.

Channeling and deposition can be minimized and maintenance costs reduced by protecting roads from flooding. Concentrated runoff in drainage ditches can dissolve gypsum in the subsurface layers and cause subsidence.

Because of the content of gypsum and other salts in the soil, salt-tolerant plants should be selected for lawns and landscaping. Application of excess water may dissolve enough gypsum in the soil to cause soil subsidence. Excessive irrigation can dissolve gypsum in the soil and cause subsidence.

Irrigation water for other crops and pasture should be applied at a rate that insures optimum production without increasing deep percolation, runoff, and erosion. Maintaining crop residue on or near the surface reduces runoff, reduces soil blowing, and helps to maintain soil tilth and organic matter content. Crops respond to nitrogen and phosphorus. Content of toxic salts is reduced by leaching, applying proper amounts of soil amendments, and returning crop residue to the soil. The average yield is 6 tons per acre for alfalfa hay grown under a high level of management.

This map unit is in capability subclasses IIIs, irrigated, and VIIs, nonirrigated. It is in horticultural group 4.

326—McCarran very cobbly fine sandy loam, 2 to 8 percent slopes. This very deep, well drained soil is on relict alluvial flats. It formed in alluvium derived dominantly from limestone and lacustrine sediment that has a high content of gypsum.

Typically, about 60 percent of the surface is covered with a desert pavement of cobbles and pebbles. The surface layer is pink very cobbly fine sandy loam about 9 inches thick. The upper 39 inches of the underlying material is pinkish white sandy loam that generally is weakly cemented with gypsum and lime. The lower part to a depth of 62 inches is pinkish white gravelly loam that is weakly cemented with gypsum and lime.

Included in this unit are about 5 percent Bracken soils on pediment remnants, 5 percent Glencarb soils on recent alluvial flats, and 5 percent Caliza soils on erosional fan remnants. Included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

Permeability of this McCarran soil is moderately slow. Available water capacity is moderate. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is high if the surface is disturbed. This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks. This soil is slightly affected by salts to a depth of 9 inches, and it is moderately affected by salts below this depth.

This unit is used as habitat for desert wildlife and for recreation. It can be used for urban development.

The main limitations for construction of dwellings are the hazard of flooding and the gypsum in the soil. Dikes and channels that have outlets for floodwater can be used to protect buildings from flooding. Subsidence caused by the dissolution of gypsum in the McCarran soil can be prevented by using foundation drains, gutters, and downspouts that discharge directly into the sewer system. Gypsum in the soil can induce electrochemical action that corrodes concrete. This limitation can be overcome by using cement that is resistant to sulfate corrosion.

The main limitation for septic tank absorption fields is the restricted permeability of the soil. Using long absorption lines and backfilling the trench with sandy material help to compensate for the restricted permeability.

Channeling and deposition can be minimized and maintenance costs reduced by protecting roads from flooding.

The main limitation for lawns and landscaping is the desert pavement. The desert pavement interferes with the use of equipment. Because of the content of gypsum and other salts in the soil, salt-tolerant plants should be selected. Excessive irrigation can dissolve gypsum in the soil and cause subsidence.

This map unit is in capability subclass VIIs, nonirrigated, and in horticultural group 4.

341—Paradise silt loam. This very deep, poorly drained soil is on recent alluvial flats. The drainage has been altered through pumping. The soil formed in alluvium derived from various kinds of rock that has a high content of lime. Slope is 0 to 2 percent.

Typically, the surface layer is gray silt loam and loam, averaging silt loam, about 10 inches thick. The upper 29 inches of the underlying material is light gray and gray sandy loam, fine sandy loam, and loam, averaging loam, and the lower part to a depth of 61 inches is white and light gray silt loam.

Permeability of the Paradise soil is moderate. Available water capacity is high. Effective rooting depth is limited by a seasonal high water table that is at a depth of 3 to 5 feet from December through March. The water table provides supplemental moisture for plants. Runoff is very slow, and the hazard of water erosion is slight. The hazard of soil blowing is high. This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks. This soil is moderately affected by salts to a depth of 10 inches, and it is not affected by salts below this depth.

This unit is used mainly for urban development. It is also used as habitat for desert wildlife and for recreation.

The main limitation for construction of dwellings is the hazard of flooding. Dikes and channels that have outlets for floodwater can be used to protect buildings from flooding.

The main limitation for septic tank absorption fields is depth to the water table. The seasonal high water table increases the possibility of failure of septic tank absorption fields. Special design of septic tank absorption fields is needed.

Channeling and deposition can be minimized and maintenance costs reduced by protecting roads from flooding.

The main limitations for lawns and landscaping are excess soluble salts in the soil. Irrigation water must be carefully applied to avoid raising the water table and increasing the concentration of salts in the soil. Because of the content of gypsum and other salts in the soil, salt-tolerant plants should be selected. Lawn grasses, shrubs, and trees that are not sensitive to lime-induced chlorosis are well suited to use in landscaping. Annual applications of iron chelates reduce the effects of chlorosis.

This map unit is in capability subclasses IVw, irrigated, and VIw, nonirrigated. It is in horticultural group 5.

360—Rock outcrop-St. Thomas complex, 15 to 30 percent slopes. This map unit is on hills and low mountains.

This unit is 50 percent Rock outcrop and 35 percent St. Thomas extremely cobbly fine sandy loam, 15 to 30 percent slopes. The Rock outcrop is on ridges, crests, and side slopes, and the St. Thomas soil is on side slopes of hills and low mountains. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are about 5 percent Bracken soils on pediment remnants and 10 percent Weiser soils on erosional fan remnants. Included areas make up about 15 percent of the total acreage.

Rock outcrop consists of exposures of barren limestone and other mixed types of bedrock.

The St. Thomas soil is shallow and well drained. It formed in residuum derived dominantly from limestone and dolomite. Typically, 90 percent of the surface is covered with a desert pavement of rock fragments. The surface layer is light yellowish brown extremely cobbly fine sandy loam about 7 inches thick. Bedrock is at a depth of about 7 inches. Depth to bedrock ranges from 4 to 20 inches.

Permeability of the St. Thomas soil is moderately rapid. Available water capacity is very low. Effective rooting depth is 4 to 20 inches. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is slight.

This unit is used as habitat for desert wildlife and for recreation.

This unit is limited for roads because of the areas of Rock outcrop, steepness of slope, and the shallow depth to bedrock. Roads should be designed to minimize cuts because of the limited depth to bedrock. Cutting and filling can be reduced by building roads in the less sloping areas of the unit. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

This map unit is in capability subclass VIIs, nonirrigated. The St. Thomas soil is in horticultural group 6.

380—Skyhaven very fine sandy loam, 0 to 4 percent slopes. This moderately deep, well drained soil is on relict alluvial flats. It formed in alluvium derived from various kinds of rock that has a high content of lime.

Typically, the surface layer is pink very fine sandy loam about 1 inch thick. The subsoil is light brown clay loam and gravelly clay loam about 7 inches thick. It averages clay loam. The underlying material to a depth of 37 inches is pinkish white and white gravelly silty clay loam and very gravelly loam. The next layer to a depth of 60 inches or more is a white, indurated, lime-cemented hardpan. Depth to the hardpan ranges from 24 to 40 inches.

Included in this unit are about 5 percent Destazo soils on relict alluvial flats, 5 percent Glencarb soils on recent alluvial flats, and 5 percent Las Vegas soils on relict alluvial flats. Included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

Permeability of the Skyhaven soil is moderately slow above the hardpan. Available water capacity is moderate. Effective rooting depth is 24 to 40 inches. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high. This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks. This soil is slightly affected by salts to a depth of 8 inches, and it is moderately affected below this depth.

This unit is used mainly as habitat for desert wildlife and for recreation. It is also used for urban development.

The main limitation for construction of dwellings is the hazard of flooding. Dikes and channels that have outlets for floodwater can be used to protect buildings from flooding. Gypsum in the soil can induce electrochemical action that corrodes concrete. This limitation can be overcome by using cement that is resistant to sulfate corrosion.

The main limitations for septic tank absorption fields are depth to the hardpan and restricted permeability. Special design of septic tank absorption fields is needed. Excavation is limited by the hardpan. Using long absorption lines and backfilling the trench with sandy material help to compensate for the restricted permeability.

Roads should be designed to minimize cuts. Channeling and deposition can be minimized and maintenance costs reduced by protecting roads from flooding. The effects of shrinking and swelling can be minimized by using an appropriate engineering design and by backfilling with material that has a low shrink-swell potential.

Because of the content of gypsum and other salts in the soil, salt-tolerant plants should be selected for lawns and landscaping. Because of the underlying hardpan, deep cuts should be avoided on this soil. Lawn grasses, shrubs, and trees that are not sensitive to lime-induced chlorosis are well suited to use in landscaping. Annual applications of iron chelates reduce the effects of chlorosis.

This map unit is in capability subclasses IIIs, irrigated, and VIIs, nonirrigated. It is in horticultural group 6.

390—Spring clay loam. This very deep, moderately well drained soil is on alluvial flats. It formed in gypsiferous lacustrine sediment. Slope is 0 to 2 percent.

Typically the surface layer is pale brown clay loam about 5 inches thick. The underlying material to a depth of 60 inches or more is stratified, light brown to pink silt loam to silty clay, averaging silty clay loam, and contains many gypsum crystals.

Included in this unit are about 10 percent Land soils on alluvial flats and 5 percent Las Vegas soils on relict alluvial flats. Included areas make up about 15 percent of the total acreage.

Permeability of the Spring soil is slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high. This soil is subject to rare periods of flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks. This soil is strongly affected by salts to a depth of 5 inches, and it is moderately affected below this depth.

This unit is used mainly for urban development. It is also used as habitat for desert wildlife and for recreation.

The main limitation for construction of dwellings is the hazard of flooding. Dikes and channels that have outlets for floodwater can be used to protect buildings from flooding. Gypsum in the soil can induce electrochemical action that corrodes concrete. This limitation can be overcome by using cement that is resistant to sulfate corrosion.

The main limitation for septic tank absorption fields is restricted permeability. Special design of septic tank absorption fields is needed. Using long absorption lines and backfilling the trench with sandy material help to compensate for the restricted permeability.

The Spring soil is limited for roads because of limited ability to support a load. Roads and streets should be designed to compensate for the instability of the soil.

The main limitation for lawns and landscaping is the excess soluble salts in the soil. Intensive management is required to reduce the salinity and maintain soil productivity. Excess salts in the soil can be flushed out by using heavy periodic applications of water. Because of the content of gypsum and other salts in the soil, salt-tolerant plants should be selected.

This map unit is in capability subclasses VIs, irrigated, and VIIs, nonirrigated. It is in horticultural group 4.

400—Tencee very gravelly fine sandy loam, 2 to 8 percent slopes. This shallow, well drained soil is on erosional fan remnants. It formed in alluvium derived dominantly from limestone and dolomite.

Typically, 75 percent of the surface is covered with a well developed desert pavement of pebbles. There is a dark desert varnish on the exposed surfaces of the rock fragments. The surface layer is light brown very gravelly fine sandy loam about 5 inches thick. The next layer is light brown very gravelly fine sandy loam and very gravelly sandy loam and is weakly cemented with lime to a depth of about 15 inches. An indurated, lime-cemented hardpan is at a depth of about 15 inches. Depth to the hardpan ranges from 7 to 20 inches.

Included in this unit are small areas of Dalian soils on side slopes of fan remnants and on inset fans. Included areas make up about 10 percent of the total acreage. The percentage varies from one area to another.

Permeability of the Tencee soil is moderate above the hardpan. Available water capacity is very low. Effective rooting depth is 7 to 20 inches. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is moderate if the surface is disturbed.

This unit is used as habitat for desert wildlife and for recreation.

This unit is limited for roads because of the depth to the indurated hardpan. Roads should be designed to minimize cuts. Heavy equipment is needed for excavation.

This map unit is in capability subclass VIIs, nonirrigated, and in horticultural group 6.

415—Aztec very gravelly sandy loam, 2 to 8 percent slopes. This very deep, well drained soil is on erosional fan remnants. It formed in alluvium derived from various kinds of rock.

Typically, 80 percent of the surface is covered with pebbles. The surface layer is light yellowish brown very gravelly sandy loam about 2 inches thick. The underlying material to a depth of 63 inches is stratified, light yellowish brown, light brown, and light reddish brown very gravelly sandy loam to extremely gravelly loamy coarse sand with weak, continuous gypsum cementation in some layers.

Included in this unit are about 5 percent Bracken soils on pediment remnants, 5 percent Rock outcrop on isolated ridges, and 5 percent Caliza soils on erosional fan remnants. Included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

Permeability of the Aztec soil is moderately slow. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is high.

if the surface is disturbed. The soil is slightly affected by salts and alkali below a depth of 2 inches.

This unit is used mainly as habitat for desert wildlife and for recreation. It is also used for waste water disposal by means of crop irrigation south of the Advanced Wastewater Treatment Plant.

Because of the slope, sprinkler or drip irrigation is most suitable for row crops. Because the soil is droughty, applications of irrigation water should be light and frequent. To avoid overirrigating and leaching of plant nutrients, applications of irrigation water should be adjusted to the available water capacity, the water intake rate, and the crop needs. Maintaining crop residue on or near the surface reduces runoff, reduces soil blowing, and helps to maintain soil tilth and organic matter content. Crops respond to nitrogen and phosphorus. The average yield is 5 tons per acre for alfalfa hay grown under a high level of management.

Roads can easily be constructed and maintained on this unit. Gypsum in the soil can induce electrochemical action that corrodes concrete. This limitation can be overcome by using cement that is resistant to sulfate corrosion.

This map unit is in capability subclasses IVs, irrigated, and VIIs, nonirrigated. It is in horticultural group 2.

417—Aztec-Rock outcrop complex, 8 to 30 percent slopes. This map unit is on erosional fan remnants interspersed with rock outcroppings.

This unit is 55 percent Aztec very gravelly sandy loam, 8 to 30 percent slopes and 30 percent Rock outcrop. The Aztec soil is on erosional fan remnants, and Rock outcrop is on ridges, crests, and side slopes. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are about 10 percent Akela soils on hillsides and 5 percent Canutio soils on foot slopes. Included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

The Aztec soil is very deep and well drained. It formed in alluvium derived from various kinds of rock. Typically, the surface layer is light yellowish brown very gravelly sandy loam about 4 inches thick. The underlying material to a depth of 60 inches or more is stratified, light reddish brown very gravelly sandy loam to extremely gravelly loamy coarse sand with weak, continuous gypsum cementation in some layers. Depth to gypsum cementation ranges from 10 to 30 inches.

Permeability of the Aztec soil is moderately slow. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is moderate if the surface is disturbed. The Aztec soil is slightly affected by salts below a depth of 4 inches.

Rock outcrop consists of exposed areas of undifferentiated volcanic rock.

This unit is used for desert wildlife habitat and recreation.

This unit is limited for roads because of the areas of Rock outcrop. Cutting and filling can be reduced by building roads in the less sloping areas of the Aztec soil. Gypsum in the soil can induce electrochemical action that corrodes concrete. This limitation can be overcome by using cement that is resistant to sulfate corrosion.

This map unit is in capability subclass VIIs, nonirrigated. The Aztec soil is in horticultural group 2.

418—Aztec-Nickel-Knob Hill complex, 2 to 15 percent slopes. This map unit is on erosional fan remnants and pediments.

This unit is 40 percent Aztec gravelly fine sandy loam, 2 to 15 percent slopes; 35 percent Nickel gravelly fine sandy loam, bedrock substratum, 2 to 15 percent slopes and 20 percent Knob Hill loamy sand, 2 to 8 percent slopes. The Aztec and Knob Hill soils are on erosional fan remnants, and the Nickel soil is on pediments. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 5 percent Rock outcrop on side slopes of erosional fan remnants and pediments. The percentage varies from one area to another.

The Aztec soil is very deep and well drained. It formed in alluvium derived from various kinds of rock. Typically, the surface layer is light yellowish brown gravelly fine sandy loam about 4 inches thick. The underlying material to a depth of 60 inches or more is stratified, light reddish brown very gravelly sandy loam to extremely gravelly loamy coarse sand with weak, continuous gypsum cementation in some layers.

Permeability of the Aztec soil is moderately slow. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is high. The Aztec soil is slightly affected by salts below a depth of 4 inches.

The Nickel soil is deep and well drained. It formed in alluvium derived from various kinds of rock. Typically, the surface layer is light brown and pink gravelly fine sandy loam about 9 inches thick. The upper 14 inches of the underlying material is pink very gravelly sandy loam that is weakly cemented with lime, and the lower part to a depth of 45 inches is pink and light brown, stratified very gravelly sandy loam to extremely gravelly loamy sand. Bedrock is at a depth of 45 inches. Depth to bedrock ranges from 40 to 60 inches or more.

Permeability of the Nickel soil is moderately slow. Available water capacity is very low. Effective rooting depth is 40 to 60 inches or more. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is high.

The Knob Hill soil is very deep and somewhat excessively drained. It formed in alluvium derived from various kinds of rock. Typically, about 20 percent of the surface is covered with a desert pavement of scattered pebbles. The surface layer is light brown loamy sand about 7 inches thick. The upper 16 inches of the underlying material is light brown, stratified gravelly loamy sand to very gravelly loamy sand, the next 14 inches is pinkish gray gravelly fine sandy loam, and the lower part to a depth of 60 inches or more is light brown loamy fine sand.

Permeability of the Knob Hill soil is moderately rapid. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high.

This unit is used as habitat for desert wildlife and for recreation.

Cutting and filling can be reduced by building roads in the less sloping areas of the unit. Gypsum in the Aztec soil can induce electrochemical action that corrodes concrete. This limitation can be overcome by using cement that is resistant to sulfate corrosion.

This map unit is in capability subclasses IVe, irrigated, and VIIc, nonirrigated. The Aztec soil is in horticultural group 2, the Nickel soil is in horticultural group 2, and the Knob Hill soil is in horticultural group 3.

419—Aztec-Bracken complex, 4 to 30 percent slopes. This map unit is on dissected pediments that have erosional fan remnants on the toe slopes.

This unit is 55 percent Aztec gravelly fine sandy loam, 4 to 15 percent slopes, and 30 percent Bracken very gravelly fine sandy loam, 8 to 30 percent slopes. The Aztec soil is on erosional fan remnants on toe slopes of dissected pediments, and the Bracken soil is on dissected pediments. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are about 5 percent Arizo soils, flooded, in channels and 10 percent Goodsprings soils on erosional fan remnants. Included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

The Aztec soil is very deep and well drained. It formed in alluvium derived from various kinds of rock. Typically, the surface layer is light yellowish brown gravelly fine sandy loam about 4 inches thick. The underlying material to a depth of 60 inches or more is stratified, light reddish brown very gravelly sandy loam to extremely gravelly loamy coarse sand with weak, continuous gypsum cementation in some horizons.

Permeability of the Aztec soil is moderately slow. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is high. The Aztec soil is slightly affected by salts below a depth of 4 inches.

The Bracken soil is deep and somewhat excessively drained. It formed in residuum derived dominantly from gypsiferous sediment. Typically, 95 percent of the surface is covered with a desert pavement of pebbles. The surface layer is pink very gravelly fine sandy loam about 1 inch thick. The upper 52 inches of the underlying material is pink sandy loam and gravelly sandy loam that averages sandy loam and contains about 75 percent gypsum crystals, and the lower part to a depth of 60 inches or more is weakly consolidated, gypsiferous sediment. Depth to the gypsiferous sediment ranges from 40 to 60 inches or more.

Permeability of the Bracken soil is moderately rapid. Available water capacity is very low. Effective rooting depth is 40 to 60 inches. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is high if the desert pavement is disturbed.

This unit is used as habitat for desert wildlife and for recreation.

This unit is limited for roads because of steepness of slope in some areas. Cutting and filling can be reduced by building roads in the less sloping areas of the unit. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed. Gypsum in the soils can induce electrochemical action that corrodes concrete. This limitation can be overcome by using cement that is resistant to sulfate corrosion. Concentrated runoff in drainage ditches can dissolve gypsum in the subsurface layers and cause subsidence.

This map unit is in capability subclass VIIs, nonirrigated. The Aztec soil is in horticultural group 2, and the Bracken soil is in horticultural group 3.

430—Knob Hill loamy sand, 0 to 4 percent slopes. This very deep, somewhat excessively drained soil is on relict sand sheets. It formed in sandy alluvium and eolian deposits derived from various kinds of rock.

Typically, about 20 percent of the surface is covered with a desert pavement of scattered pebbles. The surface layer is light brown loamy sand about 7 inches thick. The upper 16 inches of the underlying material is light brown, stratified gravelly loamy sand and very gravelly loamy sand, the next 14 inches is pinkish gray gravelly fine sandy loam, and the lower part to a depth of 60 inches or more is light brown loamy fine sand.

Included in this unit are about 5 percent Aztec soils on erosional fan remnants and 10 percent Nickel, bedrock substratum soils on pediments. Included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

Permeability of the Knob Hill soil is moderately rapid. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high.

This unit is used mainly as habitat for desert wildlife and for recreation. It is also used for urban development.

This unit is well suited to the construction of dwellings. Excavating in areas of the Knob Hill soil can expose material that is highly susceptible to soil blowing.

The main limitation for septic tank absorption fields is inadequate filtration of effluent. Because the substratum is highly permeable, special design may be needed to avoid polluting ground water and nearby water supplies.

Roads can easily be constructed and maintained on this unit.

Because the soil is droughty, applications of irrigation water to lawns and gardens should be light and frequent.

This map unit is in capability subclasses IIIs, irrigated, and VIIs, nonirrigated. It is in horticultural group 3.

440—Nickel very gravelly fine sandy loam, bedrock substratum, 2 to 8 percent slopes. This deep, well drained soil is on pediments. It formed in alluvium derived from various kinds of rock.

Typically, 50 percent of the surface is covered with pebbles. The surface layer is light brown and pink very gravelly fine sandy loam about 9 inches thick. The upper 14 inches of the underlying material is pink very gravelly sandy loam that is weakly cemented with lime, and the lower part to a depth of 45 inches is pink and light brown, stratified very gravelly sandy loam to extremely gravelly loamy sand. Bedrock is at a depth of about 45 inches. Depth to bedrock ranges from 40 to 60 inches or more.

Included in this unit are about 5 percent Arizo, flooded, soils in channels and 10 percent Aztec soils on erosional fan remnants. Included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

Permeability of the Nickel soil is moderately slow above the bedrock. Available water capacity is very low. Effective rooting depth is 40 to 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is moderate.

This unit is used mainly for urban development. It is also used as habitat for desert wildlife and for recreation.

This unit is well suited to the construction of dwellings. The design of the septic tank absorption fields should compensate for the limited depth to bedrock. Roads can easily be constructed and maintained on this unit.

The main limitations for lawns and landscaping are small stones throughout the soil and the very low available water capacity. Topsoil is needed for best results when landscaping, particularly in areas used for lawns. Frequent irrigation of lawns, gardens, and most other plantings is needed because of the limited available water capacity of the soil.

Intermittent streams form the drainageways in this unit. These drainageways are subject to rare or occasional periods of high-velocity flooding. Care should be taken during urbanization to accommodate the runoff from the drainageways. If drains become plugged during a major flood, accelerated erosion and damage to roads, buildings, and other structures can occur.

This map unit is in capability subclasses IVs, irrigated, and VIIs, nonirrigated. It is in horticultural group 2.

450—Cave Variant very cobbly very fine sandy loam, 4 to 30 percent slopes. This shallow, well drained soil is on side slopes of dissected pediments. It formed in local alluvium derived from various kinds of rock.

Typically, 95 percent of the surface is covered with a desert pavement of pebbles, cobbles, and stones. The surface layer is light yellowish brown very cobbly very fine sandy loam about 2 inches thick. The next layer to a depth of 11 inches or more is a pink gravelly very fine sandy loam and pinkish gray extremely gravelly very fine sandy loam and averages very gravelly very fine sandy loam. The upper 18 inches of the underlying material is a white, indurated, lime-cemented hardpan, the next 11 inches is pinkish gray gravelly clay loam, and the lower part to a depth of 60 inches or more is light reddish brown very cobbly coarse sandy loam. Depth to the hardpan ranges from 5 to 18 inches.

Included in this unit are about 5 percent Nickel, bedrock substratum, soils on pediments and 5 percent Rock outcrop on side slopes of pediments. Also included are small areas of soils that have a slope of less than 4 percent. Included areas make up about 10 percent of the total acreage.

Permeability of the Cave Variant soil is moderately rapid above the hardpan. Available water capacity is very low. Effective rooting depth is 5 to 18 inches. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate if the desert pavement is disturbed.

This unit is used as habitat for desert wildlife and for recreation.

This unit is limited for roads because of the depth to the indurated hardpan. Roads should be designed to minimize cuts. Heavy equipment is needed for excavation.

This map unit is in capability subclass VIIs, nonirrigated, and in horticultural group 6.

481—Hobog loamy fine sand, 15 to 50 percent slopes. This shallow, well drained soil is on low hills. It formed in residuum derived dominantly from igneous and metamorphic rock.

Typically, the surface layer is pale brown loamy fine sand about 4 inches thick. The underlying material to a depth of 13 inches is pink very gravelly sandy loam. Bedrock is at a depth of about 13 inches. Depth to bedrock ranges from 8 to 20 inches.

Included in this unit are about 5 percent Nickel soils, bedrock substratum, on pediments and 5 percent Bluepoint soils on sand sheets. Included areas make up

about 10 percent of the total acreage. The percentage varies from one area to another. Also included are areas that have slopes of less than 15 percent.

Permeability of the Hobog soil is moderate above the bedrock. Available water capacity is very low. Effective rooting depth is 8 to 20 inches. Runoff is rapid, and the hazard of water erosion is high. The hazard of soil blowing is high.

This unit is used mainly for urban development. It is also used as habitat for desert wildlife and for recreation.

The main limitations for construction of dwellings are steepness of slope and the limited depth to bedrock. Buildings should be designed to accommodate the slope. Erosion is a hazard in the steeper areas. Only the part of the site that is used for construction should be disturbed. Cuts needed to provide essentially level building sites can expose bedrock. Heavy equipment is needed for excavation.

The main limitations for septic tank absorption fields are steepness of slope and the limited depth to bedrock. Special design of septic tank absorption fields is needed.

This unit is limited for roads because of steepness of slope and the limited depth to bedrock. Cutting and filling can be reduced by building roads in the less sloping areas of the unit. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed. Heavy equipment is needed for excavation. Steepness of slope interferes with the use of equipment. Roads should be designed to minimize cuts because of the limited depth to bedrock.

The main limitations for lawns and landscaping are steepness of slope and the limited depth to bedrock. It is difficult to establish plants in areas where bedrock is exposed. Mulching and fertilizing cut areas help to establish plants. Steepness of slope interferes with the use of equipment.

This map unit is in capability subclass VIIe, nonirrigated, and in horticultural group 6.

484—Hobog very cobbly fine sandy loam, 15 to 50 percent slopes. This shallow, well drained soil is on hills. It formed in residuum and eolian deposits derived from various kinds of rock.

Typically, 85 percent of the surface is covered with rock fragments. The surface layer is pale brown and pink very cobbly fine sandy loam about 9 inches thick. The underlying material to a depth of 15 inches is pink very gravelly sandy loam. Bedrock is at a depth of about 15 inches. Depth to bedrock ranges from 8 to 20 inches.

Included in this unit are about 5 percent Arizo, flooded, soils in channels and 10 percent Rock outcrop on side slopes and ridges. Included areas make up about 15 percent of the total acreage. Also included are areas of soils that have slopes of less than 15 percent. The percentage of included areas varies from one mapped area to another.

Permeability of the Hobog soil is moderate above the bedrock. Available water capacity is very low. Effective rooting depth is 8 to 20 inches. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate.

This unit is used mainly for urban development. It is also used as habitat for desert wildlife and for recreation.

If this unit is used for urban development, the main limitations are steepness of slope, the limited depth to bedrock, and the presence of stones and cobbles. Buildings should be designed to accommodate the slope. Erosion is a hazard in the steeper areas. Only the part of the site that is used for construction should be disturbed. Heavy equipment is needed for excavation. Steepness of slope and the desert pavement interfere with the use of equipment.

Special design of septic tank absorption fields is needed.

The desert pavement makes the construction of roads difficult. Roads should be designed to minimize cuts because of the limited depth to bedrock. Cutting and filling can be reduced by building roads in the less sloping areas of the unit. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

It is difficult to establish plants in areas where bedrock is exposed. Mulching and fertilizing cut areas help to establish plants.

Intermittent streams form the drainageways in this unit. These drainageways are subject to rare or occasional periods of high-velocity flooding. Care should be taken during urbanization to accommodate the runoff from the drainageways. If drains become plugged during a major flood, accelerated erosion and damage to roads, buildings, and other structures can occur.

This map unit is in capability subclass VIIs, nonirrigated, and in horticultural group 6.

500—Canutio-Akela complex, 2 to 15 percent slopes. This map unit is on low hills.

This unit is 50 percent Canutio very cobbly sandy loam, 8 to 15 percent slopes, and 35 percent Akela very cobbly fine sandy loam, 2 to 8 percent slopes. The Canutio soil is on foot slopes, and the Akela soil is on summits, shoulders, and back slopes. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are about 10 percent Bracken soils on pediment remnants and 5 percent Rock outcrop on side slopes and ridges. Included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

The Canutio soil is deep and well drained. It formed in alluvium derived from various kinds of rock. Typically, the surface layer is light brown very cobbly sandy loam about 4 inches thick. The underlying material to a depth

of 43 inches is stratified, light brown very cobbly sandy loam, brown very gravelly sandy loam, and brown extremely gravelly sandy loam, averaging extremely gravelly sandy loam. Bedrock is at a depth of about 43 inches. Depth to bedrock ranges from 40 to 60 inches or more.

Permeability of the Canutio soil is moderately rapid above the bedrock. Available water capacity is very low. Effective rooting depth is 40 to 60 inches or more. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is moderate.

The Akela soil is shallow and well drained. It formed in residuum derived dominantly from basalt and andesite. Typically, about 92 percent of the surface is covered with a desert pavement of pebbles, cobbles, and stones. The surface layer is pale brown very cobbly fine sandy loam about 3 inches thick. The underlying material to a depth of 11 inches is light brown very gravelly fine sandy loam. Basalt is at a depth of about 11 inches. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the Akela soil is moderate above the bedrock. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is moderate if the surface is disturbed.

This unit is used as habitat for desert wildlife and for recreation.

This unit is limited for roads because of the depth to bedrock in the Akela soil. Roads should be designed to minimize cuts because of the limited depth to bedrock. Heavy equipment is needed for excavation.

This map unit is in capability subclass VIIs, nonirrigated. The Canutio soil is in horticultural group 1, and the Akela soil is in horticultural group 6.

501—Canutio gravelly fine sandy loam, 0 to 2 percent slopes. This very deep, well drained soil is on inset fans. It formed in mixed alluvium derived dominantly from limestone, quartzite, and sandstone.

Typically, about 60 percent of the surface is covered with a desert pavement of pebbles and cobbles. The surface layer is light brown gravelly fine sandy loam about 11 inches thick. The underlying material to a depth of 60 inches or more is light brown, stratified very gravelly sandy loam to very gravelly loam.

Included in this unit are about 5 percent Cave soils on erosional fan remnants and 5 percent Anzo soils, flooded, in channels. Included areas make up about 10 percent of the total acreage. The percentage varies from one area to another.

Permeability of this Canutio soil is moderately rapid. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is very slow, and the hazard of water erosion is slight. The hazard of soil blowing is high if the surface is disturbed.

This unit is used mainly as habitat for desert wildlife and for recreation. It is also used for urban development.

This unit is well suited to the construction of dwellings. Unless the density of housing is too high, septic tank absorption fields normally function well on this unit.

Roads can easily be constructed and maintained on this unit.

The main limitations for lawns and landscaping are the desert pavement and the low available water capacity. Removing the desert pavement is necessary for best results when landscaping, particularly in areas used for lawns. Because the soil is droughty, applications of irrigation water should be light and frequent.

Intermittent streams form the drainageways in this unit. These drainageways are subject to rare or occasional periods of high-velocity flooding. Care should be taken during urbanization to accommodate the runoff from the drainageways. During major floods, plugging of the drains is likely to result in accelerated erosion and possible damage to roads, homesites, and structures.

This map unit is in capability subclasses IIIs, irrigated, and VIIc, nonirrigated. It is in horticultural group 1.

502—Canutio-Cave gravelly fine sandy loams, 2 to 8 percent slopes. This map unit is on inset fans.

This unit is 55 percent Canutio gravelly fine sandy loam, 2 to 8 percent slopes, and 40 percent Cave gravelly fine sandy loam, 2 to 8 percent slopes. The Canutio soil is on inset fans, and the Cave soil is on nonburied fan remnants. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are about 5 percent Anzo soils, flooded, in channels. The percentage varies from one area to another.

The Canutio soil is very deep and well drained. It formed in mixed alluvium derived dominantly from limestone, quartzite, and sandstone. Typically, about 35 percent of the surface is covered with pebbles and 5 percent is covered with cobbles. The surface layer is light brown gravelly fine sandy loam about 9 inches thick. The underlying material to a depth of 60 inches or more is light brown, stratified very gravelly sandy loam to very gravelly loam.

Permeability of the Canutio soil is moderately rapid. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is high.

The Cave soil is shallow and well drained. It formed in mixed alluvium derived dominantly from limestone, quartzite, and sandstone. Typically, about 30 percent of the surface is covered with pebbles and 5 percent is covered with cobbles. The surface layer is pale brown gravelly fine sandy loam about 16 inches thick. The upper 14 inches of the underlying material is an indurated, lime-cemented hardpan, and the lower part to a depth of 60 inches or more is light brown very gravelly sandy loam. Depth to the hardpan ranges from 4 to 20 inches.

Permeability of the Cave soil is moderate to the hardpan. Available water capacity is very low. Effective rooting depth is 4 to 20 inches. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is high.

This unit is used mainly as habitat for desert wildlife and for recreation. It is also used for urban development.

The main limitation for construction of dwellings is the shallow depth to the hardpan in areas of the Cave soil. Excavation for building sites is limited by the hardpan.

The main limitation for septic tank absorption fields is the shallow depth to the hardpan in areas of the Cave soil. Excavation is limited by the hardpan. Special design of septic tank absorption fields is needed.

The Cave soil is limited for roads because of the shallow depth to the hardpan. Roads should be designed to minimize cuts. Heavy equipment is needed for excavation.

The main limitation for lawns and landscaping is the shallow depth to the hardpan in areas of the Cave soil. The Cave soil is also moderately limited by the desert pavement and the low available water capacity of the Canutio soil. It is difficult to establish plants in areas where the pan is exposed. Mulching and fertilizing cut areas help to establish plants. Removing the desert pavement is necessary for best results when landscaping, particularly in areas used for lawns. Because the soils are droughty, applications of irrigation water should be light and frequent. Lawn grasses, shrubs, and trees that are not sensitive to lime-induced chlorosis are well suited to use in landscaping. Annual applications of iron chelates reduce the effects of chlorosis.

Intermittent streams form the drainageways in this unit. These drainageways are subject to rare or occasional periods of high-velocity flooding. Care should be taken during urbanization to accommodate the runoff from the drainageways. If drains become plugged during a major flood, accelerated erosion and damage to roads, buildings, and other structures can occur.

This map unit is in capability subclass VIIs, nonirrigated. The Canutio soil is in horticultural group 1, and the Cave soil is in horticultural group 6.

505—Canutio-Akela complex, 15 to 50 percent slopes. This map unit is on hills.

This unit is 50 percent Canutio very cobbly sandy loam, 15 to 30 percent slopes, and 40 percent Akela very cobbly fine sandy loam, 15 to 50 percent slopes. The Canutio soil is on foot slopes, and the Akela soil is on upper back slopes and shoulders. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are about 5 percent Bracken soils, 4 to 15 percent slopes, on pediment remnants and 5 percent Rock outcrop on side slopes and ridges. Included areas make up about 10 percent of the total acreage. The percentage varies from one area to another.

The Canutio soil is deep and well drained. It formed in alluvium derived from various kinds of rock. Typically, 50 percent of the surface is covered with pebbles and 25 percent is covered with cobbles. The surface layer is light brown very cobbly sandy loam about 10 inches thick. The underlying material to a depth of 43 inches is brown very gravelly sandy loam and extremely gravelly sandy loam, averaging extremely gravelly sandy loam. Bedrock is at a depth of about 43 inches. Depth to bedrock ranges from 40 to 60 inches or more.

Permeability of the Canutio soil is moderately rapid above the bedrock. Available water capacity is very low. Effective rooting depth is 40 to 60 inches or more. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate.

The Akela soil is shallow and well drained. It formed in residuum derived dominantly from basalt and andesite. Typically, about 92 percent of the surface is covered with a desert pavement of pebbles, cobbles, and stones. The surface layer is pale brown very cobbly fine sandy loam about 3 inches thick. The underlying material to a depth of 11 inches is light brown very gravelly fine sandy loam. Basalt is at a depth of about 11 inches. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the Akela soil is moderate above the bedrock. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate if the surface is disturbed.

This unit is used as habitat for desert wildlife and for recreation.

This unit is limited for roads because of the steepness of slope and the limited depth to bedrock in areas of the Akela soil. Roads should be designed to minimize cuts because of the limited depth to the bedrock. Cutting and filling can be reduced by building roads in the less sloping areas of the unit. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

This map unit is in capability subclass VIIs, nonirrigated. The Canutio soil is in horticultural group 1, and the Akela soil is in horticultural group 6.

510—Akela-Rock outcrop complex, 15 to 50 percent slopes. This map unit is on mountains.

This unit is 55 percent Akela very cobbly fine sandy loam, 15 to 50 percent slopes, and 35 percent Rock outcrop. The Akela soil is on side slopes, and Rock outcrop is exposed on ridges and side slopes. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit is about 10 percent Canutio soils, 8 to 30 percent slopes, on side slopes. The percentage

varies from one area to another. About 500 acres, east of Henderson, is mostly an Akela soil that has slopes of 8 to 15 percent. About 40 acres of Rock outcrop, gypsum, shown by symbols, is in an area in the northeastern corner of sec. 33, T. 21 S., R. 63 E.

The Akela soil is shallow and well drained. It formed in residuum derived dominantly from basalt and andesite. Typically, about 92 percent of the surface is covered with a desert pavement of pebbles, cobbles, and stones. The surface layer is pale brown very cobbly fine sandy loam about 3 inches thick. The underlying material to a depth of 11 inches is light brown very gravelly fine sandy loam. Basalt is at a depth of about 11 inches. Depth to bedrock ranges from 10 to 20 inches.

Permeability of the Akela soil is moderate above the bedrock. Available water capacity is very low. Effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is moderate. The hazard of soil blowing is moderate if the surface is disturbed.

Rock outcrop consists of exposed areas of undifferentiated volcanic rock.

This unit is used as habitat for desert wildlife and for recreation.

This unit is limited for roads because of the areas of Rock outcrop, steepness of slopes, and shallow depth to bedrock. Roads should be designed to minimize cuts. Cutting and filling can be reduced by building roads in the less sloping areas of the unit. Roads should be provided with adequate surface drainage. Erosion can be controlled and maintenance costs reduced by stabilizing areas that have been disturbed.

This map unit is in capability subclass VIIs, nonirrigated. The Akela soil is in horticultural group 6.

540—Weiser extremely gravelly fine sandy loam, 2 to 8 percent slopes. This very deep, well drained soil is on summits and side slopes of erosional fan remnants (fig. 1). It formed in alluvium derived from various kinds of rock that have a high content of lime.

Typically, 80 percent of the surface is covered with a desert pavement of pebbles. There is a dark desert varnish on the exposed surfaces of the rock fragments. The surface layer is light yellowish brown extremely gravelly fine sandy loam about 1 inch thick. The underlying material to a depth of 63 inches is light brown extremely gravelly fine sandy loam and very gravelly fine sandy loam, averaging extremely gravelly fine sandy loam.

Included in this unit are about 5 percent Arizo soils, flooded, in channels and 10 percent Goodsprings soils on erosional fan remnants. Included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

Permeability of the Weiser soil is moderately rapid. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is moderate if the desert pavement is disturbed. Some pedons have an indurated, lime-cemented hardpan at a depth of 40 to 60 inches or more.

Most areas of this unit are used as habitat for desert wildlife and for recreation. A few areas are used for urban development.

This unit is well suited to the construction of dwellings.

Unless the density of housing is too high, septic tank absorption fields generally function well in this unit.

Roads can easily be constructed and maintained on this unit.

The main limitations for lawns and landscaping are the presence of pebbles throughout the soil and the very low available water capacity. Topsoil is needed for best results when landscaping, particularly in areas used for lawns. Frequent irrigation of lawns, gardens, and most other plantings is needed because of the limited available water capacity of the soil. Lawn grasses, shrubs, and trees that are not sensitive to lime-induced chlorosis are well suited to use in landscaping. Annual applications of iron chelates reduce the effects of chlorosis.

Intermittent streams form the drainageways in this unit. These drainageways are subject to rare or occasional periods of high-velocity flooding. Care should be taken during urbanization to accommodate the runoff from the drainageways. If drains become plugged during a major flood, accelerated erosion and damage to roads, buildings, and other structures can occur.

This map unit is in capability subclasses IVs, irrigated, and VIIs, nonirrigated. It is in horticultural group 2.

542—Weiser-Aztec complex, 2 to 8 percent slopes. This map unit is on erosional fan remnants.

This unit is 55 percent Weiser extremely gravelly fine sandy loam, 2 to 8 percent slopes, and 30 percent Aztec very gravelly fine sandy loam, 2 to 8 percent slopes. The Weiser soil is on summits and side slopes of the fan remnants, and the Aztec soil is on side slopes of the fan remnants. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are about 5 percent Arizo soils, flooded, in channels and 10 percent Goodsprings soils on erosional fan remnants. Included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

The Weiser soil is very deep and well drained. It formed in alluvium derived dominantly from limestone and dolomite. Typically, 95 percent of the surface is covered with a desert pavement of pebbles. There is a dark desert varnish on the exposed surfaces of the rock fragments. The surface layer is light yellowish brown extremely gravelly fine sandy loam about 1 inch thick. The underlying material to a depth of 63 inches is light brown extremely gravelly fine sandy loam and very

Figure 1.—An area of Weiser extremely gravelly fine sandy loam, 2 to 8 percent slopes, on erosional fan remnants southeast of Las Vegas.

gravelly fine sandy loam, averaging gravelly fine sandy loam.

Permeability of the Weiser soil is moderately rapid. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is moderate if the desert pavement is disturbed.

The Aztec soil is very deep and well drained. It formed in alluvium derived from various kinds of rock. Typically the surface layer is very pale brown very gravelly fine sandy loam about 4 inches thick. The underlying material to a depth of 60 inches or more is stratified pale brown very gravelly sandy loam to extremely gravelly loamy coarse sand with weak, continuous gypsum cementation in some layers.

Permeability of the Aztec soil is moderately slow. Available water capacity is low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is moderate. The soil is slightly affected by salts below a depth of 4 inches.

This unit is used mainly for urban development. It is also used as habitat for desert wildlife and for recreation.

This unit is well suited to the construction of dwellings. Gypsum in the Aztec soil can induce electrochemical action that corrodes concrete. This limitation can be overcome by using cement that is resistant to sulfate corrosion.

The main limitation for septic tank absorption fields is the restricted permeability of the Aztec soil. Using long absorption lines and backfilling the trench with sandy material help to compensate for the restricted permeability.

Roads can easily be constructed and maintained on this unit.

The main limitations for lawns and landscaping are the presence of pebbles throughout the soil and the very low available water capacity of the Weiser soil. Topsoil is needed for best results when landscaping, particularly in areas used for lawns. Frequent irrigation of lawns, gardens, and most other plantings is needed because of the limited available water capacity of the soil. Lawn grasses, shrubs, and trees that are not sensitive to lime-induced chlorosis are well suited to use in landscaping. Annual applications of iron chelates reduce the effects of chlorosis.

Intermittent streams form the drainageways in this unit. These drainageways are subject to rare or occasional periods of high-velocity flooding. Care should be taken during urbanization to accommodate the runoff from the drainageways. If drains become plugged during a major flood, accelerated erosion and damage to roads, buildings, and other structures can occur.

This map unit is in capability subclasses IVs, irrigated, and VIIs, nonirrigated. It is in horticultural group 2.

545—Weiser-Goodsprings complex, 2 to 4 percent slopes. This map unit is on erosional fan remnants.

This unit is 60 percent Weiser extremely gravelly fine sandy loam, 2 to 4 percent slopes, and 25 percent Goodsprings very gravelly fine sandy loam, 2 to 4 percent slopes. The Weiser and Goodsprings soils are on summits and shoulders of the fan remnants. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included in this unit are about 5 percent Las Vegas soils and 10 percent Skyhaven soils on relict alluvial flats. Included areas make up about 15 percent of the total acreage. The percentage varies from one area to another.

The Weiser soil is very deep and well drained. It formed in alluvium derived dominantly from limestone and dolomite. Typically, 90 percent of the surface layer is covered with a desert pavement of pebbles. There is a dark desert varnish on the exposed surfaces of the rock fragments. The surface layer is light yellowish brown extremely gravelly fine sandy loam about 1 inch thick. The underlying material to a depth of 63 inches is light brown extremely gravelly fine sandy loam and very gravelly fine sandy loam, averaging extremely gravelly fine sandy loam.

Permeability of the Weiser soil is moderately rapid. Available water capacity is very low. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is moderate if the desert pavement is disturbed.

The Goodsprings soil is shallow and well drained. It formed in alluvium derived from various kinds of rock. Typically, 90 percent of the surface is covered with a desert pavement of pebbles. The surface layer is light brown very gravelly fine sandy loam about 5 inches thick. The upper 10 inches of the underlying material is pink gravelly fine sandy loam, the next 37 inches is pinkish white, strongly lime-cemented hardpan, and the lower part to a depth of 60 inches or more is pink extremely gravelly loamy fine sand. Depth to the hardpan ranges from 9 to 20 inches.

Permeability of the Goodsprings soil is moderate above the hardpan. Available water capacity is very low. Effective rooting depth is 9 to 20 inches. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is high if the desert pavement is disturbed.

This unit is used as habitat for desert wildlife and for recreation.

This unit is limited for roads because of the depth to the hardpan in areas of the Goodsprings soil. Roads should be designed to minimize cuts. Heavy equipment is needed for excavation.

This map unit is in capability subclass VIIs, nonirrigated. The Weiser soil is in horticultural group 2, and the Goodsprings soil is in horticultural group 6.

600—Slickens. Slickens consists of accumulations of fine-textured material such as that separated in ore-mill operations. It is largely freshly ground rock that commonly has undergone chemical treatment during the milling process. Slickens is commonly confined in specially constructed basins.

This map unit is in capability subclass VIIIs, nonirrigated.

605—Dumps. Dumps consists of areas of smoothed or uneven accumulations of waste rock and general refuse.

This map unit is in capability subclass VIIIs, nonirrigated.

610—Pits, gravel. Pits, gravel, consists of open excavations from which soil material and gravel have been removed, exposing rock, a hardpan, or other material.

This map unit is in capability subclass VIIIs, nonirrigated.

615—Urban land. Urban land consists of areas covered by asphalt, concrete, and buildings or other urban structures.

This map unit is in capability subclass VIIIs, nonirrigated.

630—Badland. Badland is moderately steep to very steep barren land dissected by many intermittent drainage channels that have cut into soft geologic material. The areas ordinarily are not stony. Local relief generally ranges from 25 to 100 feet. Potential runoff is very high, and erosion is active. Some small included areas of identifiable soils support vegetation.

This map unit is in capability subclass VIIe, nonirrigated.

635—Rock outcrop, limestone. Rock outcrop, limestone, consists of exposed limestone, dolomite, and other kinds of bedrock that are high in content of lime.

This map unit is in capability subclass VIIIs, nonirrigated.

640—Rock outcrop, sandstone. Rock outcrop, sandstone, consists of exposed sandstone bedrock.

This map unit is in capability subclass VIIIs, nonirrigated.

645—Pits, quarry. Pits, quarry, consists of open excavations from which rock has been removed, exposing bedrock on the sides and floor.

Included in this unit are about 5 percent dumps of overburden material and 5 percent fill areas for haul roads. Included areas make up about 10 percent of the total acreage.

This map unit is in capability subclass VIIIs, nonirrigated.

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help avoid soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavioral characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture, as rangeland and woodland, as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreation facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Homeowners and landscapers can use this survey for help in selecting varieties of plants for landscaping, lawns, and gardens that are adapted to the soil conditions in a particular area.

Crops and Pasture

General management, estimated yields, and land capability subclass for each map unit used for crops and pasture is given in the section "Detailed Soil Map Units." Specific information can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for common field crops, the risk of damage if they are used for crops, and the way they respond to management. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor does it consider possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for woodland, and for engineering purposes.

In the capability system, soils are generally grouped at three levels: capability class, subclass, and unit (*13*). Only class and subclass are used in this survey. These levels are defined in the following paragraphs.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation, but they can be used for grazing or woodland.

Class VII soils have very severe limitations that make them unsuitable for cultivation and restrict their use for grazing or woodland.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial agriculture including grazing and woodland.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c* shows that the chief limitation is climate that is very cold or very dry.

In class I there are no subclasses because the soils of this class have few limitations. Class V contains only the subclasses indicated by *w, s,* or *c* because the soils in class V are subject to little or no erosion. They have other limitations that restrict their use to pasture, rangeland, woodland, wildlife habitat, or recreation. None of the soils in the Las Vegas Valley Area are in class I or class V.

Capability units are soil groups within a subclass. The soils in a capability unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity. Capability units are generally designated by adding an Arabic numeral to the subclass symbol, for example, IIe-4 or IIIe-6.

The capability classification of each map unit is given in the section "Detailed Soil Map Units."

Rangeland

Jim W. Doughty, range conservationist, Soil Conservation Service, helped to write this section.

About 60 percent of the survey area is rangeland. There is little if any commercial livestock grazing in the area. The main rangeland uses include wildlife habitat, esthetic purposes, recreation, and watershed.

A number of threatened or endangered native plants grow on the rangeland of the survey area. These include the ivory spined Utah agave, Charleston angelica, Las Vegas cryptantha, low greasebush, silverbush, Nye milkvetch, streaked Mariposa lily, golden bear poppy, Merriam bear poppy, bicolored penstemon, and Utah spikemoss. The main threats to these plants are urban expansion and recreational use of off-road vehicles. Some of the more striking plants such as the ivory spined Utah agave are threatened by collection for horticulture and landscaping.

In areas that have similar climate and topography, differences in the kind and amount of vegetation produced on rangeland are closely related to the kind of soil. Effective management is based on the relationship between the soils and vegetation and water.

Table 5 shows, for each soil, the range site; the total annual production of vegetation in favorable, normal, and unfavorable years; the characteristic vegetation; and the average percentage of each species. Only those soils that are used as rangeland or are suited to use as rangeland are listed. Explanation of the column headings in table 5 follows.

A *range site* is a distinctive kind of rangeland that produces a characteristic natural plant community that differs from natural plant communities on other range sites in kind, amount, and proportion of range plants. The relationship between soils and vegetation was established during this survey; thus, range sites generally can be determined directly from the soil map. Soil properties that affect moisture supply and plant nutrients have the greatest influence on the productivity of range plants. Soil reaction, salt content, and a seasonal water table are also important.

Total production is the amount of vegetation that can be expected to grow annually on well managed rangeland that is supporting the potential natural plant community. It includes all vegetation, whether or not it is palatable to grazing animals. It includes the current year's growth of leaves, twigs, and fruits of woody plants. It does not include the increase in stem diameter of trees and shrubs. It is expressed in pounds per acre of air-dry vegetation for favorable, normal, and unfavorable years. In a favorable year, the amount and distribution of precipitation and the temperatures make growing conditions substantially better than average. In a normal year, growing conditions are about average. In an unfavorable year, growing conditions are well below average, generally because of low available soil moisture.

Dry weight is the total annual yield per acre of air-dry vegetation. Yields are adjusted to a common percent of air-dry moisture content. The relationship of green weight to air-dry weight varies according to such factors as exposure, amount of shade, recent rains, and unseasonable dry periods.

Characteristic vegetation—the grasses, forbs, and shrubs that make up most of the potential natural plant community on each soil—is listed by common name. Under *composition*, the expected percentage of the total annual production is given for each species making up the characteristic vegetation. The amount that can be used as forage depends on the kinds of grazing animals and on the grazing season.

Range management requires a knowledge of the kinds of soil and of the potential natural plant community. It also requires an evaluation of the present range condition. Range condition is determined by comparing the present plant community with the potential natural plant community on a particular range site. The more closely the existing community resembles the potential community, the better the range condition. Range condition is an ecological rating only. It does not have a

specific meaning that pertains to the present plant community in a given use

The objective in range management is to control grazing so that the plants growing on a site are about the same in kind and amount as the potential natural plant community for that site. Such management generally results in the optimum production of vegetation, reduction of undesirable brush species, conservation of water, and control of erosion. Sometimes, however, a range condition somewhat below the potential meets grazing needs, provides wildlife habitat, and protects soil and water resources.

Windbreaks and Environmental Plantings

Windbreaks are plantings of trees, shrubs, or herbaceous plants that protect soil, crops, livestock, and buildings from direct wind damage, wind chill, blowing sand, and dust. Windbreaks also provide food and cover for wildlife, particularly songbirds and other small birds. Species selection, planting, and management techniques vary with the site and purpose. In this survey area, windbreaks must be irrigated.

Environmental plantings help to beautify and screen houses and other buildings and to abate noise. The plants, commonly evergreen shrubs and trees, are closely spaced. Healthy planting stock of suitable species should be planted properly on a well prepared site, and adequate irrigation must be provided.

Table 6 shows the height that locally grown trees and shrubs are expected to reach in 20 years on various soils. The estimates in table 6 are based on measurements and observation of established plantings that have been given adequate care. They can be used as a guide in planning windbreaks and environmental plantings. Additional information on planning windbreaks and environmental plantings and planting and caring for trees and shrubs can be obtained from local offices of the Soil Conservation Service or the Cooperative Extension Service or from a nursery.

Landscape Plantings and Horticultural Groups of Soils

Margie R. Kinnicutt, soil conservationist, Soil Conservation Service, helped to prepare this section.

This section can be used by homeowners for planning landscape plantings that are suited to the soil. Table 7 lists plants suitable for use in the survey area and general suggestions on planting.

Every soil in the survey area is assigned to one of six horticultural groups. The properties of the soils in each group are similar and have similar effects on plants. Following is a brief description of these groups of soils.

Horticultural group 1. Soils in this group have few limitations for plant growth. They are deep and very deep and are dominantly moderately coarse textured to moderately fine textured. Some of the soils are very gravelly. All of these soils have little or no visible lime within 40 inches of the surface. They are relatively free of salts in the surface layer, and salinity control is readily achieved by normal irrigation.

Horticultural group 2. The soils in this group are shallow over lime. They are deep and very deep and are dominantly coarse textured or moderately fine textured. Some of the soils are very gravelly. All contain visible lime at a depth of 4 to 20 inches. They are relatively free of salts in the surface layer, and salinity control is easily achieved by normal irrigation. The soils are somewhat droughty.

Iron and phosphorus are tied up in these soils because the concentration of lime is high. Some plants growing on these soils develop chlorosis. Chelated iron should be sprayed on chlorotic plants or applied to the soil as needed. Phosphorus should be worked into the soil as deeply as possible. Nitrogen should be applied two to four times a year.

Horticultural group 3. The soils in this group are droughty. They are dominantly coarse textured to medium textured in the surface layer. Some soils are stony to extremely stony at the surface. Most are coarse textured to a depth of 40 inches or more. Some of the soils are gravelly, and some are high in content of gypsum. All of these soils are relatively free of salts in the surface layer and have little if any visible lime above a depth of 20 inches. The soils are droughty.

Most plants respond to applications of phosphorus and nitrogen. Phosphorus should be worked into the soil as deeply as possible. Nitrogen should be applied two to four times during the year depending on the requirement of the plant species. Organic matter should be incorporated to improve the available water capacity.

Horticultural group 4. The soils in this group are saline. They are very deep and are dominantly moderately coarse textured to moderately fine textured. They contain excessive amounts of salts. Some of the soils are very gravelly, and some contain visible lime at a depth of less than 5 inches.

Unless these soils are reclaimed, only salt-tolerant species grow satisfactorily. Deep leaching with water is needed to flush the salts from the root zone and reclaim the soils. In some areas several years are needed for reclamation.

Soil material can be brought in to develop a new growing environment. Boxes or planters can be used to avoid planting in soil that has a high salt content.

Horticultural group 5. The soils in this group are wet. They have a high water table at a depth of 1.5 to 6.0 feet. They are dominantly coarse textured to moderately fine textured. Some of the soils contain excessive salts, but others are relatively free of salts.

Salt-tolerant species of plants may be used. They can be irrigated with drip systems to help control the height of the water table and content of salts in the root zone.

Soil material can be brought in to develop a new growing environment, but it must be isolated from the underlying natural soil by a layer of sand to prevent salt from rising into the new soil by capillary action. Boxes or planters can be used to avoid planting in soil that has a high salt content and high water table.

Horticultural group 6. The soils in this group have a restricted root zone. They are shallow to moderately deep. They are coarse textured to moderately fine textured and are 0 to 65 percent rock fragments. The soils are underlain by a hardpan or bedrock at a depth of 4 to 40 inches. Some of the soils are moderately saline and have management needs similar to the soils in horticultural group 4. Lime is visible in the upper layers of some of the soils, and these layers are similar to those in the soils in horticultural group 2. Water moves through the soils at a rapid to moderately slow rate, but it is stopped by the hardpan or bedrock. In level or gently sloping areas, there is a hazard of waterlogging if the soils are overirrigated. Roots cannot penetrate the hardpan or bedrock. The soils are very droughty.

The hardpan in these soils can be broken up or removed by blasting or by using heavy equipment. Adding topsoil, however, is a more practical method of increasing the rooting depth.

The high content of lime in most of the soils of this group causes iron chlorosis in susceptible plants, and chelated iron is needed. Phosphorous should be worked into the soil as needed. Nitrogen should be applied four or five times during the year.

The horticultural group to which a soil has been assigned is listed at the end of each detailed map unit description. Table 7 indicates plants suited to the soils in each horticultural group. Some of the management concerns addressed in table 7 are briefly described in the paragraphs that follow.

Fertilization. Suggestions on fertilization are general because of the many variations in soil properties and in plant response. More specific information can be obtained from a qualified local nurseryman or the County Extension Agent. Most trees and shrubs suited to this area benefit from applications of nitrogen and phosphorus. Iron is needed on some soils, especially those high in content of lime. Iron is commonly applied as chelated iron when plants display chlorotic symptoms. Iron deficiency is most common in plants growing on soils of horticultural group 2, but it can occur in plants growing on soils in other horticultural groups.

Exposure. Plants vary in their need for sunlight. The sides of a house provide four different climatic conditions. A plant needing shade should be planted on the north side, and a plant needing full sunlight should be planted on the south side. Plants may be burned if planted too close to walls exposed to the hot sun. Plants that tolerate both shade or full sunlight can be planted on the east or west side. Frost-sensitive varieties ordinarily do well in covered areas, such as patios. The desirable exposure for each plant is given in table 7.

Site preparation. When planting a tree or shrub, a hole much larger than the root ball should be excavated. Because all soils in the survey area are low in content of organic matter, some modification of the site is desirable. Peat moss, manure, straw, or other organic matter should be mixed with the soil before planting. Soils around many buildings and homesites contain debris such as building material, gypsum board, sheets of plastic, and concrete block that restrict root growth and therefore should be removed. Some soils are compacted by heavy equipment during construction. Compacted layers must be loosened. Disturbance of the soil during building site preparation has reduced the depth to the hardpan in some of the soils. In some of the soils, the hardpan can be broken with hand tools to deepen the root zone during site preparation. Filling the site with good soil material can increase the thickness of the root zone over the hardpan. Soil barriers as much as 12 inches high around the plant can be used to contain water. The area within the ridges can be filled soon after planting and the water allowed to infiltrate into the soil without further attention.

In some places, deep fills have been made and have not properly settled. Several deep irrigations are needed to cause the soil in these places to settle.

Irrigation. In this survey area, irrigation is necessary for the establishment and growth of most of the plants listed in table 7. The home gardener should become familiar with the soil he is working with and the root system of the plant. Irrigations should thoroughly wet the root zone, but they should not be so heavy that the root zone is waterlogged for many hours. Roots are killed and fungus diseases flourish in soils that are waterlogged too long, especially in hot weather. Extra deep irrigations are necessary at least once a year to prevent accumulation of soluble salts in the root zone. A soil auger or probe, long enough to reach the bottom of the root zone, is useful in determining the depth of moisture penetration and soil moisture conditions in the lower part of the root zone. The approximate rooting depth for various plants is given in table 7.

Figure 2 is a general irrigation frequency guide related to horticultural groups and average weather conditions. This guide assumes that the root zone is full or at field capacity at the start of the interval and that the plants are mature and have a fully developed root system. More detailed recommendations on how and when to irrigate are available from the local offices of the Soil Conservation Service and Cooperative Extension Service.

Recreation

The soils of the survey area are rated in table 8 according to limitations that affect their suitability for

Horticultural group	Days between irrigations			
	Type of plant	Winter	Spring and fall	Summer
1	Evergreen	90	18-36	12-25
	Deciduous	---	90	9-18
2	Evergreen	30	9-18	6-12
	Deciduous	---	9-18	4-9
3	Evergreen	30	8-15	5-10
	Deciduous	---	8-15	4-8
4	Evergreen	60	15	10
	Deciduous	---	15	7
5	Evergreen	---	32-36	22-25
	Deciduous	---	33-37	17-18
6	Evergreen	5-33	1-8	1-6
	Deciduous	8-45	1-9	1-4

Figure 2.—Recommended intervals between irrigations. Dashes indicate that irrigation is not necessary

recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, existing and potential water impoundment sites, and access to public sewerlines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreation use by the duration and intensity of flooding and the season when flooding occurs. In planning recreation facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 8, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 8 can be supplemented by other information in this survey, for example, interpretations for dwellings without basements and for local roads and streets in table 9 and interpretations for septic tank absorption fields in table 10.

Camp areas require site preparation such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to

heavy foot traffic and some vehicular traffic. The best soils have mild slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

Paths and trails for hiking, horseback riding, and bicycling should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in rating the soils.

Wildlife Habitat

Rafael J. Guerrero, soil conservationist, Soil Conservation Service, helped to write this section.

Wild birds and animals provide opportunities for recreation and improve the quality of life in the survey area. They provide outdoor recreation for naturalists and bird watchers. They also play an important role in the biological control of insect pests. Wildlife in the soil survey area is limited to openland, wetland, and rangeland wildlife.

The lack of available water in the survey area limits the population of most wildlife species. The survey area is within the Pacific Flyway for waterfowl and shore birds. Gambel quail, mourning dove, and desert cottontail are the important upland species.

Rare and endangered species in the survey area include desert tortoise, spotted bat, peregrine falcon, prairie falcon, greater sandhill crane, and Gila monster.

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. The kind and abundance of wildlife that populates an area depend on the amount and distribution of food, cover, and water. If any of these elements is missing, inadequate, or inaccessible, wildlife in the area is either scarce or nonexistent.

If the soils have the potential, wildlife habitat can be created or improved by planting appropriate vegetation, properly managing the existing plant cover, fostering the natural establishment of desirable plants, and providing an adequate water supply.

The elements of wildlife habitat in the survey area are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, salinity, and flood hazard. Irrigation is necessary to grow grain and seed crops in this area. Examples of grain and seed crops are corn, wheat, oats, and barley.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, salinity and flood hazard. Irrigation is necessary to grow domestic grasses and legumes in this area. Examples of grasses and legumes are fescue, lovegrass, bromegrass, clover, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are mustards, globemallow, wirelettuce, milkvetch, and desert trumpet.

Shrubs are bushy woody plants that produce fruit, buds, twigs, bark, and foliage. Soil properties and features that affect the growth of shrubs are depth of the root zone, available water capacity, salinity, and soil moisture. Examples of shrubs are creosotebush, white bursage, and fourwing saltbush.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, and salinity. Examples of wetland plants are smartweed, alkali sacaton, inland saltgrass, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow

water areas are depth to a hardpan, wetness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. The kinds of wildlife attracted to these areas include Gambel quail, ring-necked pheasant, meadowlark, mourning dove, field sparrow, and cottontail.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, herons, rails, muskrat, raccoons, and bullfrogs.

Habitat for rangeland wildlife consists of areas of shrubs and wild herbaceous plants. Wildlife attracted to rangeland include bobcat, jackrabbit, coyote, kangaroo rat, roadrunner, and quail.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. The ratings are given in the following tables: Building Site Development, Sanitary Facilities, Construction Materials, and Water Management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

Some soil properties that represent hazards or limitations for land use are not shown in the tables but are described in the map unit descriptions in the section "Detailed Soil Map Units." These include problems such as subsidence in the Bracken and McCarran soils because water from irrigation or other sources may dissolve enough gypsum to reduce the soil volume. Another example is the swelling caused by hydration of the sodium sulfate salts in the Land soils. The swelling is triggered by certain temperature and moisture conditions and is strong enough to cause severe damage to structures such as house slabs.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations need to be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 to 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to (1) evaluate the potential of areas for residential, commercial, industrial, and recreation uses; (2) make preliminary estimates of construction conditions; (3) evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; (4) evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; (5) plan detailed onsite investigations of soils and geology; (6) locate potential sources of gravel, sand, earthfill, and topsoil; (7) plan drainage systems, irrigation systems, ponds, and other structures for soil and water conservation; and (8) predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps and soil descriptions, and other data provided in this survey can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

Building Site Development

Table 9 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that

special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, a cemented pan, or a very firm dense layer; stone content; soil texture, and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and the depth to the water table.

Dwellings and small commercial buildings are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, and shrinking and swelling can cause the movement of footings. A high water table, depth to bedrock or to a cemented pan, large stones, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 to 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material, a base of gravel, crushed rock, or stabilized soil material, and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock or to a cemented pan, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, frost action potential, and depth to a high water table affect the traffic supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, a high water table, depth to bedrock or to a cemented pan, the available water capacity in the upper 40 inches, and the content of salts and sodium affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Sanitary Facilities

Table 10 shows the degree and the kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 10 also shows the suitability of the soils for use as daily cover for landfills. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, depth to bedrock or to a cemented pan, and flooding affect absorption of the effluent. Large stones and bedrock or a cemented pan interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 10 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

Excessive seepage because of rapid permeability of the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground water pollution. Ease of excavation and revegetation needs to be considered.

The ratings in table 10 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area type sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to wind erosion.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 11 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a probable or improbable source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet, and the depth to the water table is less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and gravel are natural aggregates suitable for commercial use with a minimum of processing. Sand and gravel are used in many kinds of construction. Specifications for each use vary widely. In table 11, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is as much as 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, have slopes of more than 15 percent, or have a seasonal water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Water Management

Table 12 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas and for embankments, dikes, and levees. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect drainage and irrigation.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; and susceptibility to flooding. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving.

The productivity of the soil after drainage is adversely affected by toxic substances in the root zone, such as salts or sodium. Availability of drainage outlets is not considered in the ratings

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of a system is affected by large stones and depth to bedrock or to a cemented pan. The performance of a system is affected by the depth of the root zone, the amount of salts or sodium, and soil reaction.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features listed in tables are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classifications, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering Index Properties

Table 13 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under "Soil Series and Their Morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the system adopted by the American Association of State Highway and Transportation Officials (*1*) and the Unified soil classification system (*2*).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, SP-SM.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Rock fragments larger than 3 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The

estimates are based on test data from the survey area or from nearby areas and on field examination

The estimates of grain-size distribution, liquid limit, and plasticity index are rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

Physical and Chemical Properties

Table 14 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under "Soil Series and Their Morphology."

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, and plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earth-moving operations.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems, septic tank absorption fields, and construction where the rate of water movement under saturated conditions affects behavior.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Salinity is a measure of soluble salts in the soil at saturation. It is expressed as the electrical conductivity of the saturation extract, in millimhos per centimeter at 25 degrees C. Estimates are based on field and laboratory measurements at representative sites of nonirrigated soils. The salinity of irrigated soils is affected by the quality of the irrigation water and by the frequency of water application. Hence, the salinity of soils in individual fields can differ greatly from the value given in the table. Salinity affects the suitability of a soil for crop production, the stability of the soil if used as construction material, and the potential of the soil to corrode metal and concrete.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The change is based on the soil fraction less than 2 millimeters in diameter. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, greater than 9 percent, is sometimes used.

Some soils contain a considerable volume of rock fragments which dilutes the fine earth fraction. Such soils shrink and swell less overall, and table 14 has been adjusted to an average shrink-swell potential for the entire control section.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, very fine sand, sand, and organic matter (up to 4 percent) and on soil structure and permeability. The estimates are modified by the presence of rock fragments. Values of K range from 0.02 to 0.55 in this survey area. The higher the

value the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their resistance to wind erosion in cultivated areas. The groups indicate the susceptibility of soil to wind erosion and the amount of soil lost. Soils are grouped according to the amount of stable aggregates 0.84 millimeters in size. These are represented idealistically by USDA textural classes. There can be soils containing rock fragments in any group.

1. Sands, fine sands, and very fine sands. These soils are generally not suitable for crops. They are extremely erodible, and vegetation is difficult to establish.

2. Loamy sands, loamy fine sands, and loamy very fine sands. These soils are very highly erodible. Crops can be grown if intensive measures to control wind erosion are used.

3. Sandy loams, coarse sandy loams, fine sandy loams, and very fine sandy loams. These soils are highly erodible. Crops can be grown if intensive measures to control wind erosion are used.

4L. Calcareous loamy soils that are less than 35 percent clay and more than 5 percent finely divided calcium carbonate. These soils are erodible. Crops can be grown if intensive measures to control wind erosion are used.

4. Clays, silty clays, clay loams, and silty clay loams that are more than 35 percent clay. These soils are moderately erodible. Crops can be grown if measures to control wind erosion are used.

5. Loamy soils that are less than 18 percent clay and less than 5 percent finely divided calcium carbonate and sandy clay loams and sandy clays that are less than 5 percent finely divided calcium carbonate. These soils are slightly erodible. Crops can be grown if measures to control wind erosion are used.

6. Loamy soils that are 18 to 35 percent clay and less than 5 percent finely divided calcium carbonate except silty clay loams. These soils are very slightly erodible. Crops can easily be grown.

7. Silty clay loams that are less than 35 percent clay and less than 5 percent finely divided calcium carbonate. These soils are very slightly erodible. Crops can easily be grown.

8. Stony or gravelly soils and other soils not subject to wind erosion.

In table 14, soils that have sufficient rock fragments on the surface for partial protection from wind erosion have been adjusted to a higher wind erodibility group.

Soil and Water Features

Table 15 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned to one of four groups. They are grouped according to the intake of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Flooding, the temporary inundation of an area, is caused by overflowing streams or by runoff from adjacent slopes. Water standing for short periods after rainfall or snowmelt is not considered flooding, nor is water in swamps and marshes.

Table 15 gives the frequency of flooding and the time of year when flooding is most likely.

Frequency and probable dates of occurrence are estimated. Frequency is expressed as none, rare, common, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions; *common* that it is likely under normal conditions; *occasional* that it occurs, on the average, no more than once in 2 years and *frequent* that it occurs, on the average, more than once in 2 years. Probable dates are expressed in months; November-May, for example, means that flooding can occur during the period November through May.

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic

matter content with increasing depth; and absence of distinctive horizons that form in soils that are not subject to flooding.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The depth to a seasonal high water table applies to undrained soils. Indicated in table 15 are the depth to the seasonal high water table and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in the table.

Only saturated zones within a depth of about 6 feet are indicated.

Depth to bedrock is given if bedrock is within a depth of 60 inches. The depth is based on many soil borings and on observations during soil mapping. The rock is specified as either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

Cemented pans are cemented or indurated subsurface layers within a depth of 60 inches. Such pans cause difficulty in excavation. Pans are classified as thin or thick. A *thin* pan is less than 3 inches thick if continuously indurated or less than 18 inches thick if discontinuous or fractured. Excavations can be made by trenching machines, backhoes, or small rippers. A *thick* pan is more than 3 inches thick if continuously indurated or more than 18 inches thick if discontinuous or fractured. Such a pan is so thick or massive that blasting or special equipment is needed in excavation.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors creates a severe corrosion environment. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low*, *moderate*, or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract. Many soils in the Las Vegas Valley Area contain calcium sulfate, in the form of gypsum, and sodium sulfate salts. These soils have a high risk of corrosion to concrete.

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (*15*). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 16 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Ten soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Aridisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Orthid (*Orth*, meaning true, plus *id*, from Aridisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Calciorthids (*Calc*, meaning lime, plus *orthid*, the suborder of the Aridisols that have a calcic horizon).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Calciorthids.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Mostly the properties are those of horizons below the surface layer. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, and depth of the root zone. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is loamy-skeletal, carbonatic, thermic Typic Calciorthids.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer or of the substratum can differ within a series.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the *Soil Survey Manual* (*12*). Many of the technical terms used in the descriptions are defined in *Soil Taxonomy* (*15*). Unless otherwise stated, colors in the descriptions are for dry soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed Soil Map Units."

Akela Series

The Akela series consists of shallow and very shallow, well drained soils on summits and side slopes of hills and mountains. These soils formed in residuum derived from basalt and andesite. Elevation is 2,200 to 3,000 feet. Slope is 2 to 50 percent.

Typical pedon of an Akela very cobbly fine sandy loam in an area of Akela-Rock outcrop complex, 15 to 50 percent slopes, 2,140 feet south and 700 feet west of the northeast corner of sec. 33, T. 21 S., R. 63 E.

About 92 percent of the surface is covered with rock fragments, of which 60 percent is pebbles, 30 percent is cobbles, and 2 percent is stones.

A1—0 to 3 inches, pale brown (10YR 6/3) very cobbly fine sandy loam, dark brown (10YR 3/3) moist;

moderate medium platy structure; soft, very friable, slightly sticky and slightly plastic, many very fine roots; many very fine and common fine interstitial pores: 35 percent cobbles and 25 percent pebbles, violently effervescent; moderately alkaline; abrupt smooth boundary.

Cca—3 to 11 inches; light brown (7.5YR 6/4) very gravelly fine sandy loam, dark brown (7.5YR 4/4) moist; massive; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots, many very fine interstitial pores; 20 percent cobbles and 40 percent pebbles; many thin lime coatings on undersides of pebbles and cobbles, violently effervescent; moderately alkaline, abrupt wavy boundary

R—11 inches; slightly weathered basalt, thin lime coatings on bedrock surfaces and in fractures.

Depth to bedrock ranges from 10 to 20 inches. The particle-size control section is sandy loam or fine sandy loam modified with 35 to 80 percent pebbles and cobbles. Reaction is mildly alkaline or moderately alkaline

Arizo Series

The Arizo series consists of very deep, excessively drained soils on recent alluvial fans, inset fans, and channels. These soils formed in mixed alluvium. Elevation is 1,500 to 3,000 feet. Slope is 0 to 8 percent

Typical pedon of an Arizo very gravelly loamy sand in an area of Arizo very gravelly loamy sand, flooded, 0 to 4 percent slopes, 800 feet north and 2,100 feet east of the southwest corner of sec. 14, T. 23 S., R. 64 E.

About 65 percent of the surface is covered with pebbles.

A1—0 to 2 inches; pale brown (10YR 6/3) very gravelly loamy sand, dark yellowish brown (10YR 4/4) moist; moderate thick platy structure; slightly hard, very friable, nonsticky and nonplastic; few very fine roots, common very fine vesicular pores, 35 percent pebbles and 2 percent cobbles; violently effervescent; moderately alkaline; abrupt wavy boundary

C1—2 to 8 inches; light brown (7.5YR 6/4) very gravelly sandy loam, brown (7.5YR 4/4) moist, weak medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic: many very fine, fine, and medium roots; many very fine, fine, and medium tubular pores; 35 percent pebbles, violently effervescent; moderately alkaline; abrupt wavy boundary

C2—8 to 24 inches; light brown (7.5YR 6/4) very gravelly loamy sand, brown (7.5YR 4/4) moist, massive; soft, very friable, nonsticky and nonplastic; many very fine, fine, and medium roots; common very fine, fine, and medium tubular pores; 45 percent pebbles; violently effervescent; moderately alkaline; abrupt wavy boundary

C3—24 to 30 inches, light brown (7.5YR 6/4) very gravelly loamy sand, brown (7.5YR 4/4) moist, massive; slightly hard, friable, nonsticky and nonplastic; few very fine and fine roots, few very fine and fine tubular pores; 55 percent pebbles and 1 percent cobbles, violently effervescent, moderately alkaline, abrupt wavy boundary.

C4—30 to 42 inches; light brown (7.5YR 6/4) extremely gravelly loamy sand, brown (7.5YR 4/4) moist, massive; soft, very friable, nonsticky and nonplastic; few very fine and fine roots; few very fine and fine tubular pores, 75 percent pebbles and 2 percent cobbles, violently effervescent; moderately alkaline; abrupt wavy boundary

C5—42 to 60 inches; light brown (7.5YR 6/4) extremely gravelly loamy sand, brown (7.5YR 4/4) moist, massive; soft, very friable, nonsticky and nonplastic, few very fine roots; few very fine interstitial pores, 65 percent pebbles, violently effervescent, moderately alkaline

The particle-size control section is stratified; the material ranges from coarse sand to loamy sand modified with 50 to 75 percent rock fragments, mostly pebbles. Individual strata in some pedons are sandy loam or fine sandy loam modified with 35 to 80 percent rock fragments. Generally, lime is throughout the profile, and in some pedons thin lime coatings are on the undersides of pebbles. The profile is mildly alkaline to strongly alkaline.

Aztec Series

The Aztec series consists of very deep, well drained soils on erosional fan remnants. These soils formed in mixed alluvium derived dominantly from gypsiferous material. Elevation is 1,600 to 3,000 feet. Slope is 2 to 30 percent.

Typical pedon of Aztec very gravelly sandy loam, 2 to 8 percent slopes, near an old gravel pit, about 300 feet south of Highway 93; about 2,100 feet west of the southeast corner of sec. 12, T. 23 S., R. 63.5 E.

About 80 percent of the surface is covered with a desert pavement of pebbles.

A1—0 to 2 inches; light yellowish brown (10YR 6/4) very gravelly sandy loam, dark yellowish brown (10YR 4/4) moist; weak very thick platy structure; soft, very friable, nonsticky and nonplastic; common very fine roots, common very fine vesicular pores, 55 percent pebbles and 4 percent cobbles, slightly effervescent mildly alkaline; abrupt wavy boundary.

C1—2 to 15 inches; light yellowish brown (10YR 6/4) extremely gravelly sandy loam, dark yellowish brown (10YR 4/4) moist; massive; soft, very friable,

nonsticky and nonplastic; many very fine and few fine roots; 75 percent pebbles and 6 percent cobbles; slightly effervescent; moderately alkaline; gradual wavy boundary

C2ca—15 to 30 inches; light brown (7.5YR 6/4) very gravelly sandy loam, dark brown (7.5YR 4/4) moist; massive; soft, very friable, nonsticky and nonplastic; many very fine and few fine roots; 55 percent pebbles, few thin lime coatings on pebbles, strongly effervescent; mildly alkaline; clear wavy boundary.

C3csca—30 to 51 inches, light reddish brown (5YR 6/4) very gravelly sandy loam, reddish brown (5YR 4/4) moist; massive; slightly hard, very friable, nonsticky and nonplastic; common very fine and few medium roots, 60 percent pebbles; many distinct gypsum crystals and gypsum pendants on pebbles, weak continuous gypsum cementation; strongly effervescent, mildly alkaline; clear wavy boundary

IIC4cs—51 to 63 inches; light reddish brown (5YR 6/4) extremely gravelly loamy coarse sand, reddish brown (5YR 4/4) moist; massive, slightly hard, very friable, nonsticky and nonplastic; few fine and medium roots; 75 percent pebbles; many distinct gypsum crystals and thin gypsum pendants on pebbles, some masses are weakly cemented by gypsum; slightly effervescent; mildly alkaline.

The depth to the gypsic horizon ranges from 10 to 30 inches. The particle-size control section is stratified. It averages sandy loam or fine sandy loam modified with 35 to 80 percent rock fragments, mostly pebbles. The gypsic horizon has weak continuous cementation in some strata. The profile is mildly alkaline to strongly alkaline

Bluepoint Series

The Bluepoint series consists of very deep, somewhat excessively drained soils. These soils formed in sandy alluvium and eolian deposits on sand sheets and sand dunes overlying alluvial flats, fan piedmonts, and low hills. Elevation is 1,400 to 2,500 feet. Slope is 0 to 15 percent.

Typical pedon of Bluepoint loamy fine sand, 4 to 15 percent slopes, about 150 feet north and 1,400 feet east of the southwest corner of sec. 36, T. 22 S., R. 61 E.

A11—0 to 2 inches; pink (7.5YR 7/4) loamy fine sand. brown (7.5YR 5/4) moist; moderate thick platy structure; soft, very friable, nonsticky and nonplastic; many very fine and fine roots and few medium roots, many fine tubular pores and few medium interstitial pores; strongly effervescent, moderately alkaline, abrupt smooth boundary

A12—2 to 3 inches, pink (7.5YR 7/4) fine sand, brown (7.5YR 5/4) moist; weak thick platy structure; soft, very friable, nonsticky and nonplastic, many very fine and fine roots, few fine and medium tubular pores and few fine interstitial pores, strongly effervescent, moderately alkaline; clear wavy boundary

C1—3 to 41 inches; pink (7.5YR 7/4) fine sand, brown (7.5YR 5/4) moist; massive; soft, very friable, nonsticky and nonplastic; many very fine roots and few fine and medium roots; few fine and medium tubular pores, slightly effervescent; moderately alkaline; gradual wavy boundary

C2ca—41 to 49 inches, pink (7.5YR 7/4) fine sand, brown (7.5YR 5/4) moist, massive; soft, very friable nonsticky and nonplastic; common very fine and fine roots, few fine interstitial pores, few fine and medium lime threads, strongly effervescent moderately alkaline; clear smooth boundary

C3ca—49 to 58 inches, pink (7.5YR 8/4) fine sand, brown (7.5YR 5/4) moist, weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; 40 percent laminar strata, about 10 millimeters thick, of light reddish brown (5YR 6/4) clay loam, reddish brown (5YR 4/4) moist, moderate medium subangular blocky structure; slightly hard friable, sticky and plastic; common very fine and fine roots few fine tubular pores; common fine and medium lime threads, strongly effervescent, moderately alkaline, abrupt wavy boundary

C4ca—58 to 67 inches, pink (7.5YR 7/4) fine sand, strong brown (7.5YR 5/6) moist; weak coarse subangular blocky structure; soft, very friable, nonsticky and nonplastic, few very fine roots; few fine interstitial pores, common fine and medium soft lime masses and few fine and medium gypsum masses; strongly effervescent moderately alkaline

The particle-size control section is loamy fine sand, loamy sand, fine sand, or sand. It averages less than 15 percent rock fragments, but as much as 30 percent pebbles is in individual strata. The profile is mildly alkaline to strongly alkaline

Bracken Series

The Bracken series consists of deep, somewhat excessively drained soils on dissected pediments and adjacent alluvial flats. These soils formed in residuum or local alluvium derived from highly gypsiferous, sedimentary rock. Elevation is 1,800 to 2,500 feet. Slope is from 2 to 30 percent.

Typical pedon of Bracken very gravelly fine sandy loam, 4 to 30 percent slopes, about 2,400 feet north and 1,900 feet east of the southwest corner of sec. 18, T. 21 S., R. 63 E

About 95 percent of the surface is covered with a desert pavement of pebbles

A1—0 to 1 inch; pink (7.5YR 7/4) very gravelly fine sandy loam, light brown (7.5YR 6/4) moist; moderate medium platy structure; slightly hard, very

friable, slightly sticky and slightly plastic; common very fine roots, many fine vesicular pores; 55 percent pebbles; violently effervescent, moderately alkaline, abrupt smooth boundary

C1cs—1 to 6 inches, pink (7.5YR 7/4) sandy loam, light brown (7.5YR 6/4) moist; massive; soft, very friable, nonsticky and nonplastic; many very fine, fine, and medium interstitial pores, 10 percent pebbles; 70 percent fine, segregated, very porous, weathered gypsum crystals, violently effervescent; mildly alkaline; gradual wavy boundary

C2cs—6 to 23 inches, pink (5YR 8/4) gravelly sandy loam, reddish yellow (5YR 7/6) moist; massive, soft and slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine vesicular pores and common medium and coarse vesicular pores; 15 percent pebbles; 75 percent porous, large, white (N 8/0) gypsum crystals; violently effervescent, mildly alkaline; clear smooth boundary

C3cs—23 to 53 inches; pink (5YR 8/3) sandy loam, pink (5YR 7/4) moist; massive; soft, very friable, nonsticky and nonplastic; few fine and medium roots and common very fine roots; many fine and very fine vesicular pores; 10 percent pebbles: 75 percent porous, large, white (N 8/0) gypsum crystals violently effervescent; mildly alkaline; abrupt wavy boundary

Cr—53 inches; weakly consolidated, gypsiferous sediment

The depth to weakly consolidated, gypsiferous sediment ranges from 40 to 60 inches or more

The particle-size control section is modified with 10 to 35 percent rock fragments, mostly pebbles. The fine earth fraction averages sandy loam or coarse sandy loam and has a clay content of 2 to 12 percent. The content of gypsum ranges from 50 to 95 percent; about half is crystals 2 to 20 millimeters in size. Reaction is mildly alkaline or moderately alkaline

Caliza Series

The Caliza series consists of very deep, well drained soils. These soils formed in mixed alluvium on erosional fan remnants and inset fan remnants. Elevation is 1,700 to 3,000 feet. Slope is 2 to 8 percent.

Typical pedon of Caliza extremely cobbly fine sandy loam, 2 to 8 percent slopes about 1,800 feet north and 600 feet east of the southwest corner of sec. 36, T. 21 S., R. 62 E

About 85 percent of the surface is covered with cobbles, stones, and pebbles.

A1—0 to 2 inches, light brown (7.5YR 6/4) extremely cobbly fine sandy loam, brown (7.5YR 4/4) moist, moderate thin platy structure; soft, very friable, nonsticky and slightly plastic; common very fine and fine roots; common fine interstitial pores and few fine tubular pores; 40 percent pebbles, 25 percent cobbles, and 2 percent stones; strongly effervescent; moderately alkaline; abrupt smooth boundary

C1—2 to 7 inches, light brown (7.5YR 6/4)very gravelly sandy loam, brown (7.5YR 4/4) moist; weak coarse subangular blocky structure; soft, very friable, nonsticky and slightly plastic; many very fine and fine roots; common fine interstitial pores and few fine tubular pores; 40 percent pebbles and 5 percent cobbles, violently effervescent, moderately alkaline; clear wavy boundary

C2ca—7 to 14 inches; pink (7.5YR 7/4) very gravelly sandy loam, brown (7.5YR 5/4) moist; massive; soft, very friable, nonsticky and slightly plastic; common very fine and fine roots and few medium roots common fine interstitial pores; 55 percent pebbles, thin lime coatings on sand grains and pebbles, weakly cemented with lime; violently effervescent moderately alkaline; gradual wavy boundary.

C3—14 to 23 inches, light brown (7.5YR 6/4) extremely gravelly loamy coarse sand, brown (7.5YR 4/4) moist, massive, soft, very friable, nonsticky and nonplastic; few fine and medium roots; common fine interstitial pores; 65 percent pebbles and 2 percent cobbles; thin lime coatings on undersides of pebbles; violently effervescent; moderately alkaline; clear wavy boundary

C4ca—23 to 31 inches; pink (7.5YR 7/4) very gravelly loamy coarse sand, brown (7.5YR 5/4) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few fine and medium roots, common fine and medium interstitial pores; 55 percent pebbles and 2 percent cobbles, thin lime coatings on sand grains and rock fragments, weakly cemented with lime; violently effervescent; moderately alkaline clear wavy boundary

C5—31 to 37 inches, light brown (7.5YR 6/4) very gravelly coarse sand, brown (7.5YR 4/4) moist; massive; soft, very friable, nonsticky and nonplastic; few fine interstitial pores; 50 percent pebbles and 2 percent cobbles; very thin lime coatings on rock fragments; violently effervescent; moderately alkaline; clear smooth boundary.

C6ca—37 to 45 inches; pink (7.5YR 7/4) extremely gravelly loamy sand, brown (7.5YR 5/4) moist; massive; slightly hard very friable, nonsticky and slightly plastic; 65 percent pebbles, thin lime coatings on sand and pebbles; weakly lime cemented with thin, discontinuous, strongly lime-cemented plates; violently effervescent; moderately alkaline, clear smooth boundary

C7ca—45 to 60 inches, light brown (7.5YR 6/4) very gravelly loamy coarse sand, brown (7.5YR 4/4) moist; massive; soft, very friable, nonsticky and nonplastic, 35 percent pebbles, 10 percent cobbles, and 5 percent stones; very thin lime coatings on

rock fragments; violently effervescent; moderately alkaline

Depth to the calcic horizon is less than 18 inches. In most pedons some strata of the calcic horizon are weakly cemented with lime.

The content of rock fragments in the particle-size control section ranges from 35 to 75 percent. The content of clay in the fine earth fraction ranges from 2 to 10 percent.

Canutio Series

The Canutio series consists of deep or very deep, well drained soils on inset fans and foot slopes of hills or mountains. These soils formed in alluvium derived from various types of rock. Elevation is 1,900 to 3,500 feet. Slope is from 0 to 30 percent.

Typical pedon of a Canutio very cobbly sandy loam, 15 to 30 percent slopes, in an area of Canutio-Akela complex, 15 to 50 percent slopes, about 850 feet south and 1,800 feet east of the northwest corner of sec. 2, T. 23 S., R. 64 E.

About 50 percent of the surface is covered with pebbles and 25 percent with cobbles.

A1—0 to 4 inches; light brown (7.5YR 6/4) very cobbly sandy loam, brown (7.5YR 4/4) moist; moderate very thick and medium platy structure; slightly hard very friable, slightly sticky and slightly plastic; common very fine roots; many very fine interstitial and tubular pores, 20 percent cobbles and 35 percent pebbles; strongly effervescent, moderately alkaline; abrupt smooth boundary.

C1—4 to 10 inches; light brown (7.5YR 6/4) very cobbly sandy loam, brown (7.5YR 4/4) moist; massive, soft friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine interstitial and tubular pores; 20 percent cobbles and 35 percent pebbles; strongly effervescent, moderately alkaline; abrupt smooth boundary.

C2—10 to 25 inches; brown (7.5YR 5/4) very gravelly sandy loam, dark brown (7.5YR 4/4) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; common very fine and fine roots; common very fine and fine interstitial pores and few very fine tubular pores, few fine patchy lime films on pebbles, 55 percent pebbles, strongly effervescent, moderately alkaline, clear smooth boundary.

C3—25 to 33 inches; brown (7.5YR 5/4) extremely gravelly sandy loam, dark brown (7.5YR 4/4) moist massive; slightly hard, friable, slightly sticky and plastic, common very fine and fine roots and few medium roots, common very fine and fine interstitial pores, few fine patchy lime films on pebbles, 75 percent pebbles; strongly effervescent, moderately alkaline, clear smooth boundary.

C4—33 to 43 inches, brown (7.5YR 5/4) extremely gravelly sandy loam, dark brown (7.5YR 4/4) moist; massive; hard, firm, slightly sticky and plastic; few fine and medium roots; common very fine and fine interstitial pores, 65 percent pebbles, few fine patchy lime films on pebbles; strongly effervescent; moderately alkaline; abrupt smooth boundary.

R—43 inches; highly weathered, hard igneous rock.

Depth to bedrock ranges from 40 to 60 inches or more. The particle-size control section is modified with 35 to 85 percent rock fragments. The fine earth fraction ranges from sandy loam to loam and has a clay content of 5 to 18 percent.

Casaga Series

The Casaga series consists of very deep, well drained soils on erosional fan remnants. These soils formed in mixed alluvium and in limestone and gypsiferous sediment. Elevation is 1,500 to 2,500 feet. Slope is 0 to 8 percent.

Typical pedon of Casaga very gravelly sandy clay loam, 0 to 8 percent slopes, at the apparent center of sec. 25, T. 19 S., R. 62 E.

The surface is covered with a desert pavement that is 80 percent pebbles and 5 percent cobbles. There is a dark desert varnish on the exposed surfaces of the rock fragments.

A1—0 to 1 inch; white (10YR 8/2) very gravelly sandy clay loam, light yellowish brown (10YR 6/4) moist, moderate medium platy structure; slightly hard friable, slightly sticky and slightly plastic; few very fine roots; many fine and very fine vesicular pores, 40 percent pebbles, violently effervescent; strongly alkaline; abrupt smooth boundary.

B21t—1 to 4 inches; very pale brown (10YR 7/3) clay loam, yellowish brown (10YR 5/4) moist; strong very coarse prismatic structure parting to strong medium subangular blocky; hard, friable, slightly sticky and plastic; few very fine roots, many very fine vesicular pores; few thin clay films on peds, 1 percent pebbles; violently effervescent; strongly alkaline; abrupt wavy boundary.

B22t—4 to 8 inches; brown (7.5YR 5/4) clay loam, dark brown (7.5YR 4/4) moist; strong coarse prismatic structure parting to strong medium and fine subangular blocky; very hard, friable, sticky and plastic; common fine and very fine roots; common very fine tubular pores, few thin clay films on peds; few medium soft lime and gypsum masses; violently effervescent; very strongly alkaline; clear wavy boundary.

B23tca—8 to 21 inches; brown (7.5YR 5/4) clay loam, dark brown (7.5YR 4/4) moist, moderate medium prismatic structure parting to strong medium

subangular blocky, hard, friable, sticky and plastic, few very fine roots; many very fine and fine tubular pores, few thin clay films on peds; few fine soft gypsum bodies and common coarse soft lime masses, violently effervescent; moderately alkaline; clear wavy boundary.

IIC1ca—21 to 41 inches, light brown (7.5 YR 6/4) very gravelly clay loam, brown (7.5YR 5/4) moist; massive, hard, friable, sticky and plastic; common very fine tubular pores, many lime coatings and pendants on pebbles, weakly cemented with lime; many coarse soft lime masses; 60 percent pebbles violently effervescent; strongly alkaline, clear wavy boundary

IIIC2—41 to 47 inches, pink (7.5YR 7/4) very gravelly sandy loam brown (7.5YR 5/4) moist, massive; soft very friable, nonsticky and slightly plastic; common very fine tubular pores; common thin lime coatings on undersides of pebbles, 50 percent pebbles, violently effervescent; strongly alkaline; abrupt wavy boundary

IVC3cs—47 to 60 inches, pinkish white (7.5YR 8/2) gravelly sandy loam, light brown (7.5YR 6/4) moist, massive; slightly hard, very friable, nonsticky and slightly plastic; few very fine roots; common very fine interstitial and tabular pores; many coarse and very coarse gypsum crystals, weakly cemented by gypsum; 30 percent pebbles, strongly effervescent; mildly alkaline

The Bt horizon is modified with less than 15 percent rock fragments. The content of clay in the fine earth fraction ranges from 27 to 35 percent. The lower part of the Bt horizon in most pedons has gypsum masses or crystals It is moderately alkaline to very strongly alkaline.

The C horizon is modified with 30 to 60 percent rock fragments, mostly pebbles. Lime seams or masses and gypsum masses or crystals are common. The horizon is mildly alkaline to strongly alkaline.

Cave Series

The Cave series consists of shallow and very shallow, well drained soils on erosional and nonburied fan remnants. These soils formed in mixed alluvium. Elevation is 1,900 to 3,800 feet. Slope is 0 to 15 percent.

Typical pedon of Cave very stony sandy loam, 0 to 4 percent slopes, 1,600 feet north and 50 feet east of the southwest corner of sec 20, T 22 S., R. 62 E.

About 70 percent of the surface is covered with fragments of rock and hardpan

A1—0 to 3 inches, very pale brown (10YR 7/3) very stony sandy loam, dark yellowish brown (10YR 4/4) moist, strong very thick platy structure; slightly hard, very friable, slightly sticky and slightly plastic common very fine and fine roots; many very fine and fine vesicular pores, 15 percent pebbles, 15 percent cobbles, and 15 percent stones, violently effervescent; mildly alkaline; clear wavy boundary

C1—3 to 6 inches; very pale brown (10YR 7/4) gravelly sandy loam, yellowish brown (10YR 5/6) moist; weak medium subangular blocky structure, soft, very friable; nonsticky and nonplastic; few very fine and fine roots; few very fine and fine interstitial pores; 25 percent pebbles, violently effervescent; moderately alkaline; abrupt wavy boundary

C2cam—6 to 60 inches, indurated very gravelly and cobbly lime-cemented hardpan.

Depth to the indurated petrocalcic horizon ranges from 4 to 20 inches. The particle-size control section is modified with 15 to 35 percent rock fragments. The fine earth fraction is loam, fine sandy loam, or sandy loam and has a clay content of 10 to 20 percent.

Cave Variant

The Cave Variant consists of shallow and very shallow, somewhat excessively drained soils on dissected pediments. These soils formed in alluvium derived from mixed igneous rock Elevation is 2,100 to 2,200 feet. Slope is from 0 to 30 percent

Typical pedon of Cave Variant very cobbly very fine sandy loam, 4 to 30 percent slopes, about 1,940 feet west and 750 feet north of the southeast corner of sec 25, T. 23 S., R 64 E

The surface is covered with a desert pavement that is about 70 percent pebbles, 20 percent cobbles, and 5 percent stones

A1—0 to 2 inches; light yellowish brown (10YR 6/4) very cobbly very fine sandy loam, dark brown (7.5YR 4/4) moist; moderate thick and medium platy structure, soft, very friable, slightly sticky and slightly plastic; common very fine roots and few fine roots, many very fine interstitial pores and common very fine and fine tubular pores; 35 percent pebbles and 20 percent cobbles; 13 percent calcium carbonate equivalent; violently effervescent; moderately alkaline, abrupt smooth boundary

C1ca—2 to 5 inches; pink (7.5YR 7/4) gravelly very fine sandy loam, brown (7.5YR 5/4) moist; moderate coarse and medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many very fine roots and common fine and medium roots, many very fine interstitial pores and common fine and medium tubular pores; 15 percent pebbles, 23 percent calcium carbonate equivalent; violently effervescent; moderately alkaline; abrupt irregular boundary.

C2ca—5 to 11 inches pinkish gray (7.5YR 7/2) extremely gravelly very fine sandy loam, brown (7.5YR 5/4) moist; moderate medium and coarse

subangular blocky structure, slightly hard, friable, slightly sticky and plastic; common very fine roots and few fine and medium roots; many very fine interstitial pores and common fine and medium tubular pores, 70 percent pebbles and caliche fragments; thick and very thick lime coatings on pebbles, 30 percent calcium carbonate equivalent, violently effervescent; moderately alkaline, abrupt irregular boundary

C3cam—11 to 29 inches, white (10YR 8/1) indurated petrocalcic horizon; abrupt irregular boundary

IIC4cacs—29 to 40 inches; pinkish gray (5YR 7/2) gravelly clay loam, reddish brown (5YR 5/3) moist, massive; slightly hard, friable, slightly sticky and plastic; few very fine roots, common very fine interstitial and tubular pores; weakly cemented with lime; 30 percent pebbles; many thick lime coatings and pendants on gravel; common vertically oriented gypsum crystals; 52 percent calcium carbonate equivalent, violently effervescent; moderately saline; moderately alkaline; abrupt wavy boundary

IIIC5cs—40 to 60 inches: light reddish brown (5YR 6/3) very cobbly coarse sandy loam; reddish brown (5YR 5/3) moist; massive; soft, very friable, nonsticky and slightly plastic. few very fine roots; many very fine and fine interstitial pores 20 percent pebbles and 15 percent cobbles, common thick gypsum pendants on the undersides of rock fragments; slightly effervescent; 7 percent calcium carbonate equivalent, moderately saline; mildly alkaline

Depth to the indurated petrocalcic horizon ranges from 5 to 18 inches The particle-size control section is modified with 35 to 80 percent rock fragments. The fine earth fraction is sandy loam or very fine sandy loam and is 7 to 18 percent clay Rock fragments are commonly coated with lime and caliche fragments constitute a large percentage of the rock fragments in most pedons. The part of the profile immediately underlying the petrocalcic horizon is high in calcium carbonate content and is moderately saline. Gypsum crystals are common below the petrocalcic horizon in many pedons.

Dalian Series

The Dalian series consists of very deep, well drained soils on inset fans, fan skirts, and side slopes of fan remnants. These soils formed in alluvium derived primarily from limestone and dolomite. Elevation is 2,200 to 4,000 feet. Slope is 0 to 8 percent.

Typical pedon of Dalian very gravelly fine sandy loam, 2 to 4 percent slopes, about 500 feet south and 1,840 feet east of the northwest corner of sec 5, T. 20 S. R 60 E.

About 65 percent of the surface is covered with pebbles.

A1—0 to 4 inches light yellowish brown (10YR 6/4) very gravelly fine sandy loam. dark yellowish brown (10YR 4/4) moist; moderate medium and thin platy structure, soft, very friable, nonsticky and nonplastic, many very fine and common fine roots, many very fine interstitial pores and few fine tubular pores, 40 percent pebbles; violently effervescent, moderately alkaline; abrupt smooth boundary

C1ca—4 to 11 inches, light yellowish brown (10YR 6/4) extremely gravelly fine sandy loam, dark yellowish brown (10YR 4/4) moist massive; soft, very friable, nonsticky and nonplastic, common very fine and fine roots, many very fine interstitial pores, 65 percent pebbles and 5 percent cobbles, thin discontinuous lime coatings on undersides of rock fragments; violently effervescent; moderately alkaline, abrupt smooth boundary

C2ca—11 to 17 inches; light yellowish brown (10YR 6/4) very gravelly sandy loam, yellowish brown (10YR 5/4) moist, massive; soft, very friable, nonsticky and nonplastic, many very fine roots and common fine and medium roots; many very fine interstitial pores, 55 percent pebbles; thin discontinuous lime coatings on undersides of pebbles, violently effervescent, moderately alkaline; abrupt smooth boundary

C3ca—17 to 41 inches; light yellowish brown (10YR 6/4) extremely gravelly fine sandy loam, yellowish brown (10YR 5/4) moist; massive, soft, very friable, slightly sticky and nonplastic, common very fine and fine roots; many very fine interstitial pores, 75 percent pebbles and 5 percent cobbles, thin discontinuous lime coatings on undersides of rock fragments, violently effervescent; moderately alkaline; clear wavy boundary.

C4ca—41 to 46 inches; light yellowish brown (10YR 6/4) extremely gravelly fine sandy loam, yellowish brown (10YR 5/4) moist, massive, soft, very friable, slightly sticky and nonplastic; few very fine and fine roots, many very fine interstitial pores; 70 percent pebbles and 5 percent cobbles; thin lime coatings surrounding or on undersides of rock fragments; violently effervescent, moderately alkaline, clear wavy boundary.

C5—46 to 61 inches; very pale brown (10YR 7/4) extremely gravelly sandy loam, yellowish brown (10YR 5/4) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine and fine roots, common very fine and fine interstitial pores, 60 percent pebbles and 5 percent cobbles, violently effervescent; moderately alkaline

The particle-size control section is modified with 35 to 80 percent rock fragments, mostly limestone pebbles. The fine earth fraction averages sandy loam or fine sandy loam and is 3 to 12 percent clay. Calcium carbonate content averages more than 40 percent

Destazo Series

The Destazo series consists of very deep, well drained soils on erosional fan remnants, dissected pediments, and relict alluvial flats. These soils formed in mixed alluvium. Elevation is 1,600 to 2,800 feet. Slope is 0 to 15 percent.

Typical pedon of a Destazo fine sandy loam in an area of Las Vegas-Destazo complex, 0 to 2 percent slopes, 1,700 feet west and 2,500 feet south of the northeast corner of sec. 6, T. 20 S., R. 61 E.

About 25 percent of the surface is covered with pebbles and nodules of lime.

A11—0 to 2 inches; very pale brown (10YR 7/3) fine sandy loam, yellowish brown (10YR 5/4) moist; moderate medium platy structure; slightly hard, very friable, slightly sticky and slightly plastic; few very fine roots; many very fine interstitial pores; 5 percent pebbles; strongly effervescent; moderately alkaline; abrupt smooth boundary.

A12—2 to 11 inches; very pale brown (10YR 7/4) fine sandy loam, yellowish brown (10YR 5/4) moist; moderate medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots, common medium roots, and few coarse roots; many very fine and fine interstitial pores and few fine and medium tubular pores; 3 percent pebbles; strongly effervescent; moderately alkaline; clear smooth boundary.

C1ca—11 to 15 inches; very pale brown (10YR 7/4) gravelly sandy clay loam, pale brown (10YR 6/3) moist; massive; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots and common medium roots; many very fine and fine interstitial pores; weakly cemented with lime in some parts; 20 percent hard lime concretions; violently effervescent; moderately alkaline; abrupt smooth boundary.

C2ca—15 to 34 inches; light gray (10YR 7/2) very gravelly sandy clay loam, pale brown (10YR 6/3) moist; massive; slightly hard, very friable, sticky and plastic; common fine roots and few very fine and medium roots; many very fine and fine interstitial pores and few fine and medium tubular pores; weakly cemented with lime; 50 percent hard lime concretions; violently effervescent; moderately alkaline; gradual wavy boundary.

C3ca—34 to 41 inches; white (10YR 8/2) extremely gravelly sandy clay loam, light gray (10YR 7/3) moist; massive; slightly hard, very friable, slightly sticky and plastic; few fine and medium roots; many very fine and fine interstitial pores and few fine and medium tubular pores; weakly cemented with lime; 65 percent pebbles and hard lime concretions and 5 percent cobbles; violently effervescent; moderately alkaline; clear wavy boundary.

C4ca—41 to 47 inches; white (10YR 8/2) very gravelly sandy clay loam, light gray (10YR 7/2) moist; massive; slightly hard, friable, slightly sticky and plastic; common fine and medium roots; many very fine interstitial pores; weakly cemented with lime; 55 percent pebbles and hard lime concretions; violently effervescent; moderately alkaline; abrupt wavy boundary.

C5ca—47 to 51 inches; white (10YR 8/2) extremely gravelly sandy clay loam, very pale brown (10YR 7/3) moist; massive; hard, friable, slightly sticky and plastic; few fine and medium roots; common very fine, few fine, and few medium tubular pores; weakly cemented with lime; 70 percent pebbles and hard lime concretions; 5 percent cobbles; violently effervescent; moderately alkaline; abrupt wavy boundary.

IIC6cacs—51 to 62 inches; light brown (7.5YR 6/4) sandy loam, brown (7.5YR 5/4) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; common very fine roots and few fine and medium roots; few very fine and medium tubular pores and few fine interstitial pores; 10 percent pebbles; common fine white and clear gypsum crystals; violently effervescent; moderately alkaline.

The particle-size control section is modified with 35 to 80 percent rock fragments, mostly hard lime nodules. The fine earth fraction is sandy clay loam, clay loam, or sandy loam; the content of clay ranges from 18 to 35 percent. Calcium carbonate content averages more than 40 percent.

The lower part of the C horizon in most pedons contains fewer hard lime nodules than the particle-size control section. The texture and content of rock fragments in the lower part of the C horizon vary.

Glencarb Series

The Glencarb series consists of very deep, well drained soils. These soils formed in mixed alluvium on flood plains and recent alluvial flats. Elevation is 1,200 to 2,500 feet. Slope is 0 to 2 percent.

Typical pedon of Glencarb silt loam, about 2,400 feet south and 200 feet east of the northwest corner of sec. 33, T. 20 S., R. 62 E.

A11—0 to 3 inches; pale brown (10YR 6/3) silt loam, yellowish brown (10YR 5/4) moist; weak thin platy structure; soft, very friable, slightly sticky and slightly plastic; few very fine roots; violently effervescent; strongly alkaline; abrupt smooth boundary.

A12—3 to 6 inches; pale brown (10YR 6/3) silt loam, yellowish brown (10YR 5/4) moist; many dark grayish brown (10YR 4/2) organic lamellae; weak fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; few very

fine and fine roots; violently effervescent, strongly alkaline; abrupt wavy boundary

C1—6 to 16 inches; very pale brown (10YR 7/4) clay loam, yellowish brown (10YR 5/4) moist; massive; soft, very friable, sticky and plastic; common very fine and fine roots and few medium roots; violently effervescent, moderately alkaline; clear smooth boundary.

C2—16 to 51 inches; very pale brown (10YR 7/3) silty clay loam, yellowish brown (10YR 5/4) moist; massive; slightly hard, friable, sticky and plastic; common fine roots and few medium roots; violently effervescent, strongly alkaline; abrupt smooth boundary.

C3—51 to 54 inches; very pale brown (10YR 7/4) very fine sandy loam, yellowish brown (10YR 5/4) moist; massive; soft, very friable, slightly sticky and slightly plastic; violently effervescent; moderately alkaline; abrupt smooth boundary

C4—54 to 60 inches; very pale brown (10YR 7/3) silty clay loam, yellowish brown (10YR 5/4) moist; massive; slightly hard, friable, sticky and plastic, violently effervescent; moderately alkaline

The particle-size control section is dominantly clay loam, silty clay loam, silt loam, or loam. The content of clay ranges from 18 to 35 percent, and the content of sand that is fine or coarser is less than 15 percent. The profile is moderately alkaline or strongly alkaline. In some pedons a petrocalcic horizon is at a depth of 40 to 60 inches

Goodsprings Series

The Goodsprings series consists of well drained soils that are shallow and very shallow over a petrocalcic horizon and are on erosional fan remnants. These soils formed in mixed alluvium derived primarily from limestone and sandstone. Elevation is 2,000 to 3,000 feet. Slope is 2 to 4 percent.

Typical pedon of Goodsprings gravelly fine sandy loam, 2 to 4 percent slopes, about 2,400 feet south and 1,400 feet east of the northwest corner of sec. 18, T. 22 S., R. 61 E.

About 90 percent of the surface is covered with a well developed desert pavement of pebbles. A dark desert varnish is on the exposed surfaces of the rock fragments.

A11—0 to 1 inch; light brown (7.5YR 6/4) gravelly fine sandy loam, brown (7.5YR 5/4) moist, moderate thick platy structure; soft, very friable, slightly sticky and slightly plastic; common fine roots; many very fine and fine vesicular pores, 20 percent pebbles, violently effervescent; moderately alkaline; abrupt smooth boundary

A12—1 to 5 inches, light brown (7.5YR 6/4) gravelly fine sandy loam, brown (7.5YR 5/4) moist, weak thick platy structure parting to weak coarse subangular blocky; soft, very friable, slightly sticky and slightly plastic; common fine and many very fine roots; common very fine and fine interstitial pores; 20 percent pebbles, violently effervescent; moderately alkaline; abrupt wavy boundary

C1ca—5 to 11 inches; pink (7.5YR 7/4) gravelly fine sandy loam, strong brown (7.5YR 5/6) moist, weak medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic, many very fine roots and few fine and medium roots; few fine interstitial pores; 20 percent pebbles; violently effervescent; strongly alkaline; clear wavy boundary.

C2ca—11 to 15 inches; pink (7.5YR 7/4) gravelly fine sandy loam, strong brown (7.5YR 5/6) moist, massive; slightly hard, very friable, slightly sticky and plastic, common very fine, fine, and medium roots, few very fine and fine interstitial pores; 30 percent pebbles; weakly cemented with lime; violently effervescent, strongly alkaline; clear wavy boundary

C3cam—15 to 27 inches; reddish brown (5YR 5/4) and pinkish white (5YR 8/2) strongly cemented petrocalcic hardpan, reddish brown (5YR 4/4) and pink (5YR 7/4) moist; very hard, firm and very firm, clear wavy boundary.

C4cam—27 to 52 inches, reddish brown (5YR 5/4) and pinkish white (5YR 8/2 strongly cemented petrocalcic hardpan, reddish brown (5YR 4/4) and pink (5YR 7/4) moist; extremely hard, very firm; abrupt wavy boundary

C5—52 to 60 inches; pink (7.5YR 7/4) extremely gravelly loamy fine sand, brown (7.5YR 5/4) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine and fine interstitial pores; 70 percent pebbles; violently effervescent; strongly alkaline.

Depth to the petrocalcic horizon ranges from 9 to 20 inches. The particle-size control section is modified with 15 to 35 percent rock fragments, mostly pebbles, and it is fine sandy loam, sandy loam, or loam. The content of clay is 5 to 12 percent. The profile is moderately alkaline to very strongly alkaline

The petrocalcic horizon is 18 to 42 inches thick

Grapevine Series

The Grapevine series consists of very deep, well drained soils on basin floor remnants, relict alluvial flats, and side slopes of erosional fan remnants. These soils formed in loamy alluvium derived from various types of gypsiferous rock. Elevation is 1,700 to 2,400 feet. Slope is 0 to 8 percent.

Typical pedon of Grapevine very fine sandy loam, 0 to 2 percent slopes, approximately 900 feet north and 1,700 feet east of the southwest corner of sec 31, T. 21 S., R. 61 E.

About 10 percent of the surface is covered with scattered pebbles.

A1—0 to 1 inch; pink (7.5YR 7/4) very fine sandy loam, strong brown (7.5YR 5/6) moist; strong medium platy structure; slightly hard, friable, slightly sticky and slightly plastic; few very fine roots; many very fine and fine vesicular pores; 5 percent pebbles; violently effervescent; moderately alkaline; abrupt wavy boundary.

C1—1 to 5 inches; pink (7.5YR 7/4) very fine sandy loam, strong brown (7.5YR 5/6) moist; weak very coarse prismatic structure; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; 10 percent pebbles; violently effervescent; moderately alkaline; abrupt wavy boundary.

C2ca—5 to 17 inches; pink (7.5YR 7/4) fine sandy loam, strong brown (7.5YR5/6) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine, fine, and medium roots; many fine distinct white (N 8/0) lime filaments; 5 percent pebbles; violently effervescent; moderately alkaline; abrupt wavy boundary.

C3ca—17 to 30 inches; pinkish white (7.5YR 8/2) fine sandy loam, pinkish gray (7.5YR 7/2) moist; massive; slightly hard and hard, friable, slightly sticky and slightly plastic; common very fine and fine roots; weakly cemented with lime; 15 percent soft lime masses; violently effervescent; moderately alkaline; abrupt irregular boundary.

C4ca—30 to 50 inches; pink (7.5YR 7/4) very fine sandy loam, light brown (7.5YR 6/4) moist; massive; hard, friable, slightly sticky and slightly plastic; common very fine and few fine roots; 25 percent soft lime masses; 2 percent pebbles; violently effervescent; moderately alkaline; clear wavy boundary.

IC5csca—50 to 54 inches; reddish yellow (5YR 6/6) fine sandy loam, yellowish red (5YR 4/6) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; few very fine roots; many very fine interstitial pores and few very fine tubular pores; few fine distinct white (N 8/0) gypsum masses; 5 percent soft lime masses; 10 percent pebbles; violently effervescent; moderately alkaline; abrupt wavy boundary.

IC6cs—54 to 69 inches; pink (5YR 7/4) loam, light reddish brown (5YR 6/4) moist; massive; hard, very friable, slightly sticky and slightly plastic; common fine and medium prominent white (N 8/0) gypsum masses; slightly effervescent; moderately alkaline.

The calcic horizon has few to common, fine or medium, soft masses or nodules of lime, which normally increase in size and degree of cementation as depth increases. Calcium carbonate equivalent ranges from 15 to 40 percent.

Depth to the calcic horizon is 5 to 10 inches. Depth to the weakly cemented part of the calcic horizon is 17 to 48 inches.

The particle-size control section is dominantly fine sandy loam or sandy loam modified with 5 to 15 percent pebbles, and it is 10 to 18 percent clay. It is moderately alkaline or strongly alkaline.

Hobog Series

The Hobog series consists of shallow and very shallow, well drained soils on rolling hills. These soils formed in residuum of igneous and metamorphic rock. Elevation is 2,300 to 2,600 feet. Slope is from 8 to 50 percent.

Typical pedon of Hobog very cobbly fine sandy loam, 15 to 50 percent slopes, about 1,580 feet east and 1,540 feet north of the southwest corner of sec. 23, T. 22 S., R. 62 E.

The surface is covered with 50 percent pebbles, 25 percent cobbles, and 10 percent stones.

A1—0 to 1 inch; pale brown (10YR 6/3) very cobbly fine sandy loam, brown (10YR 4/3) moist; strong very thick and thick platy structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine roots; common very fine tubular pores; 30 percent pebbles, 20 percent cobbles, and 10 percent stones; 6 percent calcium carbonate equivalent; strongly effervescent; moderately alkaline; abrupt smooth boundary.

C1ca—1 to 9 inches; pink (7.5YR 7/4) very cobbly fine sandy loam, brown (7.5YR 5/4) moist; moderate medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; common fine and very fine roots; common very fine tubular pores; 20 percent pebbles and 20 percent cobbles; rock fragments coated with a thin layer of lime; disseminated lime; 15 percent calcium carbonate equivalent; violently effervescent; moderately alkaline; abrupt wavy boundary.

C2ca—9 to 15 inches; pink (7.5YR 8/4) very gravelly sandy loam, brown (7.5YR 5/4) moist; massive; hard, very friable, slightly sticky and slightly plastic; few fine and medium roots; common very fine interstitial pores; 50 percent pebbles and 5 percent cobbles; pinkish white (7.5YR 8/2) lime filling root channels and pores and weakly cementing rock fragments; 24 percent calcium carbonate equivalent; violently effervescent; strongly alkaline; abrupt wavy boundary.

R—15 inches; hard andesite; calcium carbonate filling fractures.

Depth to bedrock ranges from 8 to 20 inches. The particle-size control section is modified with 35 to 75 percent rock fragments, mostly pebbles and cobbles.

The fine earth fraction is dominantly loam or sandy loam and is 9 to 25 percent clay. Rock fragments are generally cemented with lime, and fractures in the bedrock are filled with secondary lime. The profile is mildly alkaline to strongly alkaline. In some areas the surface layer consists of eolian material.

Jean Series

The Jean series consists of very deep, excessively drained soils. These soils formed in mixed alluvium on inset fans and channels. Elevation is 2,000 to 3,600 feet. Slope is 0 to 4 percent.

Typical pedon of Jean gravelly loamy fine sand, 2 to 4 percent slopes, about 2,640 feet south of the northwest corner of sec. 7, T. 22 S., R. 61 E.

About 40 percent of the surface is covered with pebbles, and less than 1 percent is covered with cobbles.

A1—0 to 1 inch; pink (7.5YR 7/4) gravelly loamy fine sand, brown (7.5YR 5/3) moist; weak medium platy structure; soft, very friable, nonsticky and nonplastic; many very fine, many fine, and few medium vesicular pores; violently effervescent; moderately alkaline; abrupt smooth boundary.

C1—1 to 8 inches; light reddish brown (5YR 6/4) loamy fine sand, reddish brown (5YR 5/4) moist; weak very coarse prismatic structure; soft, very friable, nonsticky and nonplastic; common very fine roots; common very fine tubular pores; violently effervescent; moderately alkaline; clear smooth boundary.

C2—8 to 18 inches; pink (7.5YR 7/4) loamy fine sand, brown (7.5YR 5/4) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine roots; many very fine interstitial pores; 10 percent pebbles; very thin lime films on lower sides of pebbles; violently effervescent; moderately alkaline; clear smooth boundary.

IIC3ca—18 to 25 inches; pink (7.5YR 7/4) very gravelly loamy sand, light reddish brown (7.5YR 6/4) moist; massive; soft, very friable, nonsticky and nonplastic; many very fine and fine interstitial pores; 40 percent pebbles; thin lime crusts on lower sides of pebbles; violently effervescent; strongly alkaline; clear smooth boundary.

IIC4—25 to 60 inches; pink (7.5YR 7/4) stratified extremely gravelly sand to very gravelly loamy fine sand, brown (7.5YR 5/4) moist; single grain; loose, nonsticky and nonplastic; many very fine and fine interstitial pores; violently effervescent; moderately alkaline.

Depth to the Cca horizon is 14 to 20 inches. Depth to very gravelly or extremely gravelly material is 16 to 30 inches.

The upper part of the particle-size control section is loamy fine sand or fine sand and is modified with less than 15 percent rock fragments. The lower part is crudely stratified and is extremely gravelly sand to very gravelly loamy fine sand. When mixed, the control section is modified with 35 to 80 percent rock fragments. Reaction is moderately alkaline or strongly alkaline.

Knob Hill Series

The Knob Hill series consists of very deep, somewhat excessively drained soils on erosional fan remnants and relict sand sheets. These soils formed in mixed alluvium. Elevation is 2,000 to 2,300 feet. Slope is from 0 to 8 percent.

Typical pedon of Knob Hill loamy sand, 0 to 4 percent slopes, at the northwest corner of sec. 33, T. 23 S., R. 64 E.

About 20 percent of the surface is covered with scattered pebbles.

A1—0 to 7 inches; light brown (7.5YR 6/4) loamy sand, brown (7.5YR 4/2) moist; weak thick platy structure; soft, very friable, nonsticky and nonplastic; few fine roots; many very fine interstitial pores; slightly effervescent; moderately alkaline; clear smooth boundary.

C1—7 to 23 inches; light brown (7.5YR 6/4) crudely stratified gravelly loamy sand and very gravelly loamy sand, brown (7.5YR 4/2) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine roots; many very fine and fine interstitial pores; 20 percent pebbles; slightly effervescent; moderately alkaline; clear wavy boundary.

C2ca—23 to 37 inches; pinkish gray (7.5YR 7/2) gravelly fine sandy loam, brown (7.5YR 5/2) moist; massive; slightly hard, friable, nonsticky and slightly plastic; many very fine interstitial pores; 20 percent pebbles; weakly cemented with lime; 8 percent medium, hard, white lime concretions; violently effervescent; moderately alkaline; clear wavy boundary.

C3—37 to 60 inches; light brown (7.5YR 6/4) loamy fine sand, brown (7.5YR 5/2) moist; massive; soft, very friable, nonsticky and nonplastic; many very fine interstitial pores; few lime-coated pebbles; strongly effervescent; moderately alkaline.

Depth to the calcic horizon ranges from 16 to 24 inches. The particle-size control section is stratified and has an average rock fragment content of 20 to 35 percent. The fine earth fraction averages loamy fine sand. The content of rock fragments in individual strata ranges from 0 to 60 percent. The profile is moderately alkaline or strongly alkaline.

Pebbles in the calcic horizon are coated with lime. Lime concretions are common or many.

Land Series

The Land series consists of very deep, somewhat poorly drained soils that formed in mixed alluvium on recent alluvial flats. Elevation is 1,400 to 2,200 feet. Slope is 0 to 2 percent.

Typical pedon of Land silty clay loam, 220 feet east and 250 feet north of the southwest corner of sec. 29, T. 20 S., R. 62 E.

A1—0 to 2 inches; very pale brown (10YR 7/3) silty clay loam, brown (10YR 4/3) moist; strong medium platy structure; slightly hard, very friable, sticky and plastic; many very fine and fine roots; common very fine and fine interstitial pores; violently effervescent; moderately alkaline; abrupt smooth boundary.

C1sa—2 to 7 inches; pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; weak thick platy structure; slightly hard, very friable, sticky and slightly plastic; many very fine and fine roots and few medium roots; common very fine interstitial pores; common very fine salt masses; violently effervescent; strongly alkaline; abrupt wavy boundary.

C2sa—7 to 10 inches; pale brown (10YR 6/3) loam, brown (10YR 5/3) moist; massive; soft, very friable, sticky and plastic; many very fine and fine roots and common medium roots; few fine interstitial pores; many fine and medium salt masses; violently effervescent; strongly alkaline; clear smooth boundary.

C3sa—10 to 23 inches; pale brown (10YR 6/3) silty clay loam, brown (10YR 5/3) moist; massive; soft, very friable, sticky and plastic; many very fine and common fine roots; many very fine and fine salt masses; violently effervescent; strongly alkaline; gradual smooth boundary.

C4sa—23 to 29 inches; pale brown (10YR 6/3) silty clay loam, brown (10YR 5/3) moist; massive; soft, very friable, sticky and slightly plastic; many very fine and common fine roots; common very fine salt masses; violently effervescent; strongly alkaline; clear smooth boundary.

C5—29 to 35 inches; light yellowish brown (10YR 6/4) silty clay loam, yellowish brown (10YR 5/4) moist; massive; slightly hard, very friable, sticky and plastic; few very fine roots; violently effervescent; strongly alkaline; clear smooth boundary.

C6—35 to 48 inches; very pale brown (10YR 7/3) silty clay loam, light yellowish brown (10YR 6/4) moist; massive; slightly hard, very friable, sticky and plastic; few very fine roots; violently effervescent; very strongly alkaline; gradual smooth boundary.

C7—48 to 64 inches; very pale brown (10YR 7/3) silty clay loam, light yellowish brown (10YR 6/4) moist; massive; slightly hard, very friable, sticky and plastic; violently effervescent; very strongly alkaline.

Depth to the Csa horizon ranges from 1 to 28 inches.

The particle-size control section averages silty clay loam or silt loam and is 18 to 35 percent clay. It is less than 15 percent sand that is fine or coarser. Thin strata of coarser or finer textured material are common. Reaction is moderately alkaline to very strongly alkaline.

Some parts of the Csa horizon have a soluble salt content of 2 to 15 percent. The horizon is 8 to 25 inches thick.

Las Vegas Series

The Las Vegas series consists of shallow and very shallow, well drained soils on basin floor remnants and relict alluvial flats. These soils formed in alluvium derived from limestone and in lacustrine sediment. Elevation is 1,600 to 2,800 feet. Slope is 0 to 4 percent.

Typical pedon of Las Vegas gravelly fine sandy loam, 0 to 2 percent slopes, about 1,300 feet north and 400 feet east of the southwest corner of sec. 20, T. 19 S., R. 16 E.

About 25 percent of the surface is covered with pebbles and fragments of hardpan.

A11—0 to 1 inch; very pale brown (10YR 7/3) gravelly fine sandy loam, yellowish brown (10YR 5/4) moist; strong medium platy structure; soft, very friable, slightly sticky and slightly plastic; few fine and many very fine vesicular pores; 30 percent pebbles; 40 percent calcium carbonate; violently effervescent; moderately alkaline; abrupt smooth boundary.

A12—1 to 3 inches; very pale brown (10YR 7/3) fine sandy loam, yellowish brown(10YR 5/4) moist; moderate thick platy structure; soft, very friable, nonsticky and nonplastic; few very fine, fine, and medium roots; many very fine interstitial pores; 10 percent pebbles; 37 percent calcium carbonate; violently effervescent; strongly alkaline; abrupt smooth boundary.

C1—3 to 7 inches; very pale brown (10YR 7/3) fine sandy loam, yellowish brown (10YR 5/4) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine roots and common medium roots; few fine and medium tubular pores and many very fine and fine interstitial pores; 5 percent pebbles; 53 percent calcium carbonate; violently effervescent; strongly alkaline; abrupt wavy boundary.

C2ca—7 to 11 inches; very pale brown (10YR 7/3) gravelly sandy clay loam, pale brown (10YR 6/3) moist; massive; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots and common medium roots, most oriented horizontally on or near the underlying hardpan; many very fine, common fine, and common medium interstitial pores; 25 percent hard pebble-sized calcium carbonate nodules; 68 percent calcium carbonate;

violently effervescent; strongly alkaline; abrupt wavy boundary

C3cam—11 inches, white (N 8/0) indurated lime-cemented petrocalcic hardpan; white (10YR 8/1) moist; extremely hard, extremely firm.

Depth to the petrocalcic horizon ranges from 3 to 14 inches. The particle-size control section is modified with 5 to 35 percent pebble-size rock fragments, mostly caliche. It is stratified and averages less than 18 percent clay, but it includes layers of sandy clay loam or loam that is more than 18 percent clay. The calcium carbonate equivalent ranges from 40 to 85 percent. A small amount of gypsum is in the C horizon in some pedons. The profile is moderately alkaline or strongly alkaline.

The petrocalcic horizon is indurated and has a platy structure or is massive. Plates of strongly cemented material are between indurated plates in some pedons. The petrocalcic horizon is more than 36 inches thick.

McCarran Series

The McCarran series consists of very deep, well drained soils on relict alluvial flats and foot slopes of basin floor remnants. These soils formed in mixed alluvium derived from limestone, sandstone, and gypsiferous sediment. Elevation is 1,500 to 2,300 feet. Slope is 0 to 8 percent.

Typical pedon of McCarran fine sandy loam, 0 to 4 percent slopes, 2,640 feet south and 2,140 feet west of the northeast corner of sec. 8, T. 21 S., R. 61 E.

About 20 percent of the surface is covered with pebbles.

A1—0 to 1 inch; very pale brown (10YR 7/4) fine sandy loam, light yellowish brown (10YR 6/4) moist; moderate thick and medium platy structure; slightly hard, very friable, slightly sticky and slightly plastic; few very fine roots; many very fine interstitial and tubular pores; 10 percent pebbles; 19 percent calcium carbonate; violently effervescent; moderately alkaline; abrupt smooth boundary.

C1—1 to 4 inches; pink (7.5YR 7/4) fine sandy loam, light brown (7.5YR 6/4) moist; weak medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; common very fine roots and few fine roots; many very fine interstitial pores; 12 percent pebbles; 19 percent calcium carbonate; violently effervescent; moderately alkaline; abrupt wavy boundary.

C2—4 to 9 inches; pink (7.5YR 7/4) gravelly fine sandy loam, light brown (7.5YR 6/4) moist; weak coarse and medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many very fine roots and common fine roots; many very fine interstitial pores; 15 percent pebbles; 20 percent calcium carbonate; 3 percent very fine gypsum crystals; violently effervescent; moderately alkaline; abrupt wavy boundary.

C3cs—9 to 15 inches; pink (7.5YR 7/4) sandy loam, strong brown (7.5YR 5/6) moist; massive; soft and slightly hard, very friable, nonsticky and slightly plastic; few very fine, fine, and medium roots; many very fine interstitial pores; 10 percent pebbles with gypsum pendants on undersides; 11 percent calcium carbonate; 9 percent gypsum as fine secondary crystals and pendants; strongly effervescent; moderately alkaline; clear wavy boundary.

C4cs—15 to 48 inches; pinkish white (7.5YR 8/2) sandy loam, light brown (7.5YR 6/4) moist; massive; slightly hard, very friable, nonsticky and slightly plastic; few very fine, fine, and medium roots; many very fine and fine interstitial pores; 10 percent pebbles with gypsum pendants; weakly cemented with gypsum and lime; 7 percent calcium carbonate; 35 percent gypsum as medium and fine crystals and secondary masses as much as 1 inch in diameter; effervescent; mildly alkaline; gradual wavy boundary.

IIC5cs—48 to 62 inches; pinkish white (7.5YR 8/2) gravelly loam, pink (7.5YR 8/4) moist; massive; hard, very friable, slightly sticky and slightly plastic; many very fine and common fine interstitial pores; 25 percent pebbles with gypsum pendants; weakly lime and gypsum cemented; 27 percent calcium carbonate; 13 percent gypsum as pendants, fine to coarse crystals, and secondary masses as much as three-fourths of an inch in diameter; strongly effervescent; moderately alkaline.

The particle-size control section is commonly fine sandy loam, sandy loam, or loam. In some pedons are minor strata of coarser or finer textured material. Rock fragment content ranges from 0 to 15 percent. The content of clay in the fine earth fraction averages less than 18 percent and is commonly 5 to 10 percent. Gypsum plus calcium carbonate equivalent averages less than 40 percent by weight.

In some parts of the gypsic horizon, the content of gypsum is as much as 40 percent. Reaction is mildly alkaline or moderately alkaline.

McCullough Series

The McCullough series consists of very deep, well drained soils on fan skirts. These soils formed in mixed alluvium derived from sedimentary and metamorphic rock. Elevation is 2,000 to 2,500 feet. Slope is 0 to 4 percent.

Typical pedon of a McCullough fine sandy loam in an area of McCullough-Jean-Bluepoint complex, 0 to 4 percent slopes, approximately 600 feet east and 1,120 feet north of the southwest corner of sec. 5, T. 22 S., R. 61 E.

A1—0 to 2 inches, pink (7.5YR 7/4) fine sandy loam, brown (7.5YR 5/4) moist, moderate thin and medium platy structure; soft, very friable, nonsticky and nonplastic, few very fine roots; few very fine vesicular pores and many very fine interstitial pores, 5 percent pebbles; violently effervescent; moderately alkaline; abrupt wavy boundary.

B21—2 to 5 inches; light brown (7.5YR 6/4) gravelly sandy loam, strong brown (7.5YR 5/6) moist; very weak coarse prismatic structure; slightly hard, very friable, nonsticky and nonplastic; common very fine roots; common very fine tubular pores and many very fine interstitial pores, 15 percent pebbles; common thin clay films on undersides of pebbles, violently effervescent; moderately alkaline; abrupt wavy boundary.

B22—5 to 20 inches, pink (7.5YR 7/4) fine sandy loam, strong brown (7.5YR 5/6) moist; many coarse distinct iron mottles, reddish yellow (7.5YR 6/8) moist; few coarse faint soft lime masses, pink (7.5YR 7/4) moist, weak fine subangular blocky structure; soft, very friable, nonsticky and slightly plastic; few medium, common very fine, and common fine roots; few fine and medium interstitial pores and many very fine interstitial pores; violently effervescent; moderately alkaline; clear wavy boundary.

B3—20 to 26 inches; pink (7.5YR 8/4) fine sandy loam, light brown (7.5YR 6/4) moist; few fine distinct iron mottles, reddish yellow (7.5YR 6/8) and pink (7.5YR 7/4) moist; massive; soft, very friable, nonsticky and slightly plastic; common very fine and fine roots; few very fine tubular pores and many very fine interstitial pores, violently effervescent, moderately alkaline, abrupt wavy boundary.

C1cacs—26 to 32 inches; pink (7.5YR 7/4) loam, brown (7.5YR 5/4) moist; common medium distinct iron mottles, strong brown (7.5YR 5/6) moist; very weak fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic, many fine and very fine roots, many very fine interstitial and tubular pores; common fine lime and gypsum filaments, weak lime cementation; violently effervescent, moderately alkaline, abrupt wavy boundary.

C2cacs—32 to 35 inches, pink (7.5YR 7/4) fine sandy loam, brown (7.5YR 5/4) moist; common medium distinct iron mottles, strong brown (7.5YR 5/6) moist; moderate medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; common fine roots, common very fine tubular pores, weak lime and gypsum cementation; violently effervescent; strongly alkaline; abrupt wavy boundary.

C3—35 to 48 inches, pink (7.5YR 7/4) fine sand, strong brown (7.5YR 5/6) moist; massive; soft, very friable, nonsticky and nonplastic; few fine roots; many very fine interstitial pores; violently effervescent; strongly alkaline; abrupt wavy boundary.

C4—48 to 62 inches, pink (7.5 YR 7/4) fine sand, brown (7.5YR 5/4) moist; massive; soft, very friable, nonsticky and nonplastic; common fine roots, many very fine interstitial pores; strongly effervescent; strongly alkaline.

Depth to the calcic horizon is 20 to 36 inches. Some parts of the calcic horizon are weakly cemented with lime or with lime and gypsum.

The 10- to 40-inch control section is stratified but averages fine sandy loam or sandy loam and is modified with less than 15 percent rock fragments. Strata in the upper part of the control section range from sandy loam to loam, strata in the lower part range from coarse sand to loamy fine sand and are gravelly or very gravelly in some pedons.

In some pedons, part of the profile below a depth of 40 inches is very gravelly or extremely gravelly. The profile is moderately alkaline or strongly alkaline.

Nickel Series

The Nickel series consists of deep, well drained soils on erosional fan remnants and pediments. These soils formed in mixed alluvium derived mainly from igneous and sedimentary rock. Elevation is 2,000 to 2,400 feet. Slope is 2 to 15 percent.

Typical pedon of Nickel very gravelly fine sandy loam, bedrock substratum, 2 to 8 percent slopes, about 2,400 feet north and 2,350 feet east of the southwest corner of sec. 10, T. 29 S., R. 64 E.

About 50 percent of the surface is covered with pebbles.

A1—0 to 2 inches; light brown (7.5YR 6/4) very gravelly fine sandy loam, brown (7.5YR 4/4) moist, moderate very thick platy structure; slightly hard, very friable, slightly sticky and nonplastic; few very fine roots, common very fine and fine vesicular and interstitial pores; 35 percent pebbles; strongly effervescent, moderately alkaline; abrupt smooth boundary.

C1ca—2 to 9 inches; pink (7.5YR 7/4) very gravelly fine sandy loam, brown (7.5YR 5/4) moist, weak medium subangular blocky structure; soft, very friable, slightly sticky and nonplastic; few fine and common very fine roots, many very fine and common fine tubular and interstitial pores, 35 percent pebbles, violently effervescent; moderately alkaline, clear smooth boundary.

C2ca—9 to 23 inches; pink (7.5YR 8/4) very gravelly sandy loam, light brown (7.5YR 6/4) moist; massive; slightly hard, friable, slightly sticky and nonplastic, few fine roots and common very fine roots; common very fine tubular pores, 45 percent pebbles; weakly cemented with lime, lime disseminated throughout

horizon and coating pebbles, violently effervescent, moderately alkaline; clear smooth boundary.

C3ca—23 to 37 inches pink (7.5YR 7/4) very gravelly sandy loam, brown (7.5YR 5/4) moist; massive; soft, very friable, slightly sticky and nonplastic; many very fine roots, common very fine interstitial and tubular pores; 40 percent pebbles, lime disseminated throughout horizon and coating pebbles; strongly effervescent; moderately alkaline; clear wavy boundary.

C4—37 to 45 inches, light brown (7.5YR 6/4) extremely gravelly loamy sand, brown (7.5YR 4/4) moist, massive, soft, very friable, nonsticky and nonplastic; common very fine interstitial pores, 65 percent pebbles, strongly effervescent, moderately alkaline; clear wavy boundary.

R—45 inches, unweathered conglomerate

Depth to bedrock ranges from 40 to 60 inches. Depth to the calcic horizon ranges from 10 to 25 inches. The particle-size control section averages 50 to 80 percent gravel and cobbles. The fine earth fraction averages sandy loam or fine sandy loam and is less than 15 percent clay. The calcic horizon is 15 to 25 percent calcium carbonate equivalent. The profile is moderately alkaline or strongly alkaline.

Paradise Series

The Paradise series consists of very deep, poorly drained soils in spring areas of recent alluvial flats. The drainage has been altered as a result of local pumping. These soils formed in mixed alluvium derived mainly from limestone. Elevation is 1,800 to 2,100 feet. Slope is 0 to 2 percent.

Typical pedon of Paradise silt loam about 1,500 feet north and 1,550 feet east of the southwest corner of sec. 25, T. 20 S., R. 61 E.

A11—0 to 1 inch, gray (10YR 5/1) silt loam, very dark gray (10YR 3/1) moist; moderate medium platy structure, slightly hard, very friable, slightly sticky and slightly plastic; common very fine roots, many very fine interstitial and tubular pores, violently effervescent, very strongly alkaline; abrupt smooth boundary.

A12ca—1 to 5 inches, gray (10YR 5/1) loam, black (10YR 2/1) moist; strong medium subangular blocky structure parting to strong fine and medium granular, slightly hard, friable, slightly sticky and slightly plastic; many very fine and fine roots and common medium roots; common very fine and fine tubular pores and many very fine interstitial pores; few fine and medium threads of lime on peds and in pores; violently effervescent; very strongly alkaline; abrupt wavy boundary.

A13ca—5 to 10 inches, gray (10YR 6/1) silt loam, dark gray (10YR 4/1) moist; moderate medium prismatic structure parting to strong fine and medium subangular blocky, hard, friable, slightly sticky and slightly plastic, many very fine and fine roots and common medium roots; many very fine and medium tubular pores, many fine and medium threads of lime on peds and in pores; weakly cemented with lime; violently effervescent; strongly alkaline, abrupt wavy boundary.

AC—10 to 16 inches, gray (10YR 6/1) sandy loam, very dark gray (10YR 3/1) moist; moderate fine and medium granular structure; soft, very friable, nonsticky and nonplastic, many very fine, fine, and medium roots; many very fine, fine, and medium tubular pores; violently effervescent, strongly alkaline, abrupt wavy boundary.

C1ca—16 to 23 inches; light gray (10YR 7/2) fine sandy loam, brown (10YR 5/3) moist, massive, very hard, firm, nonsticky and slightly plastic; common very fine and few fine roots, many very fine, fine, and medium tubular pores; weakly cemented with lime; violently effervescent; strongly alkaline, clear wavy boundary.

C2—23 to 39 inches; light gray (10YR 7/2) loam, brown (10YR 5/3) moist, massive; hard, firm, nonsticky and slightly plastic; few very fine and medium roots and common fine roots, many very fine to medium tubular pores; violently effervescent; moderately alkaline; gradual wavy boundary.

C3ca—39 to 53 inches; white (10YR 8/2) silt loam, very pale brown (10YR 7/3) moist; massive, hard, firm, slightly sticky and plastic; few very fine and common fine roots; many very fine to medium tubular pores, few fine and medium prominent strong brown (7.5YR 5/8) relict iron mottles, weakly cemented with lime; violently effervescent; moderately alkaline, gradual wavy boundary.

C4ca—53 to 61 inches; light gray (10YR 7/2) silt loam brown (10YR 5/3) moist; massive; slightly hard, firm, slightly sticky and plastic; few very fine and fine roots; many very fine and common fine tubular pores, few fine and medium prominent strong brown (7.5YR 5/8) relict iron mottles, weakly cemented with lime; violently effervescent, moderately alkaline.

The mollic epipedon in undisturbed areas is 7 to 24 inches thick. The control section is stratified. It commonly is sandy loam, loam, or silt loam and minor strata of coarser or finer textured material. It averages 8 to 18 percent clay and is more than 15 percent sand that is fine or coarser. Thin, extremely hard, discontinuous, lime-cemented strata are in some pedons. Reaction ranges from moderately alkaline to very strongly alkaline.

Pittman Series

The Pittman series consists of moderately deep, well drained soils on erosional fan remnants and nonburied

fan remnants. These soils formed in mixed alluvium derived from volcanic and sedimentary rock. Elevation is 1,800 to 2,200 feet. Slope is 2 to 8 percent.

Typical pedon of a Pittman extremely cobbly fine sandy loam, 2 to 8 percent slopes, in an area of Caliza-Pittman-Arizo complex, 0 to 8 percent slopes, approximately 1,125 feet north and 2,450 feet east of the southwest corner of sec. 15, T. 22 S., R. 63 E.

About 75 percent of the surface is covered with cobbles and pebbles.

A1—0 to 2 inches; pale brown (10YR 6/3) extremely cobbly fine sandy loam, dark brown (10YR 3/3) moist; weak thin platy structure; soft, very friable, nonsticky and slightly plastic; common very fine roots; many very fine vesicular pores; 40 percent pebbles and 25 percent cobbles; strongly effervescent; mildly alkaline; abrupt smooth boundary.

C1—2 to 6 inches; light brown (7.5YR 6/4) gravelly loam, brown (7.5YR 4/4) moist; weak medium subangular blocky structure; slightly hard, very friable, nonsticky and slightly plastic; common very fine roots and few fine roots; many very fine and fine interstitial pores; 30 percent pebbles; strongly effervescent; moderately alkaline; clear wavy boundary.

IIC2—6 to 19 inches; light brown (7.5YR 6/4) extremely gravelly loamy sand, brown (7.5YR 5/4) moist; massive; soft, very friable, nonsticky and nonplastic; many very fine roots and few fine and medium roots; many very fine and fine interstitial pores; 50 percent pebbles and 15 percent cobbles; strongly effervescent; moderately alkaline; clear wavy boundary.

IIC3ca—19 to 23 inches; light brown (7.5YR 6/4) extremely gravelly coarse sand, brown (7.5YR 4/4) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few medium roots; many very fine and fine interstitial pores; very weakly cemented with lime; 65 percent pebbles; strongly effervescent; moderately alkaline; abrupt wavy boundary.

IIC4cam—23 to 32 inches; pinkish white and pink (7.5YR 8/2 and 8/4) indurated lime-cemented hardpan, light brown and brown (7.5YR 5/4 and 6/4) moist; massive; extremely hard, extremely firm; 85 percent pebbles; violently effervescent; abrupt wavy boundary.

IIC5cam—32 to 50 inches; light brown (7.5YR 6/4) strongly lime-cemented hardpan, brown (7.5YR 4/4) moist; massive; extremely hard, extremely firm; interbedded with thin layers of weakly silica-cemented extremely gravelly sand; few fine roots; 60 percent pebbles and 5 percent cobbles; strongly effervescent; moderately alkaline; clear wavy boundary.

IIC6ca—50 to 61 inches; light brown (7.5YR 6/4) extremely gravelly sand, brown (7.5YR 4/4) moist; massive; very hard, very firm, nonsticky and nonplastic; few fine roots; weakly lime-cemented; strongly lime-cemented masses; 65 percent pebbles and 3 percent cobbles; strongly effervescent; moderately alkaline (pH 7.9).

Depth to the petrocalcic horizon ranges from 20 to 30 inches. The particle-size control section averages 35 to 85 percent rock fragments, mostly pebbles. The fine earth fraction commonly averages loamy sand but includes strata of sand to loam. Clay content averages 2 to 12 percent. Reaction is mildly alkaline or moderately alkaline.

Skyhaven Series

The Skyhaven series consists of moderately deep, well drained soils on relict alluvial flats. These soils formed in mixed alluvium derived dominantly from limestone. Elevation is 2,000 to 2,600 feet. Slope is 0 to 4 percent.

Typical pedon of Skyhaven very fine sandy loam, 0 to 4 percent slopes, about 300 feet north and 2,590 feet east of the southwest corner of sec. 6, T. 20 S., R. 60 E.

A1—0 to 1 inch; pink (7.5YR 7/4) very fine sandy loam, brown (7.5YR 5/4) moist; moderate thin platy structure; slightly hard, friable, slightly sticky and slightly plastic; few very fine roots; many very fine interstitial pores and common very fine vesicular pores; 3 percent small pebbles; 22 percent calcium carbonate equivalent; violently effervescent; moderately alkaline; abrupt wavy boundary.

B2t—1 to 4 inches; light brown (7.5YR 6/4) clay loam, brown (7.5YR 5/4) moist; strong medium prismatic structure parting to strong coarse subangular blocky; hard, friable, sticky and plastic; few very fine and fine roots; few very fine and fine tubular pores and common very fine interstitial pores; 3 percent small pebbles; few thin clay films on faces of peds and in root channels and common clay bridges between sand grains; 24 percent calcium carbonate equivalent; violently effervescent; strongly alkaline; abrupt wavy boundary.

B3tca—4 to 8 inches; light brown (7.5YR 6/4) gravelly clay loam, brown (7.5YR 5/4) moist; moderate coarse subangular blocky structure; slightly hard, friable, sticky and plastic; few medium roots and common very fine and fine roots; many very fine interstitial pores; few thin clay films on faces of peds and in root channels; 15 percent pebbles and caliche fragments; common, indurated and hard medium lime nodules, white (N 8/0) dry and pink (7.5YR 7/4) moist; 62 percent calcium carbonate

equivalent; violently effervescent; strongly alkaline, abrupt wavy boundary

C1cacs—8 to 28 inches, pinkish white (7.5YR 8/2) gravelly silty clay loam, pink (7.5YR 8/4) moist, massive, slightly hard, friable, sticky and plastic; few medium and fine roots and common very fine roots, common very fine tubular and interstitial pores; 25 percent white (N 8/0) caliche fragments, few fine gypsum crystals; 80 percent calcium carbonate equivalent; violently effervescent; moderately alkaline; gradual wavy boundary.

C2cacs—28 to 37 inches, white (N 8/0) gravelly loam, pink (7.5YR 7/4) moist; massive; slightly hard, friable, sticky and plastic; few very fine and fine roots; common very fine interstitial and tubular pores. 30 percent white (N 8/0) caliche fragments; few fine gypsum crystals, 90 percent calcium carbonate equivalent; moderately alkaline; abrupt wavy boundary

C3cam—37 to 60 inches; white (N 8/0), indurated, lime-cemented hardpan, pink (7.5YR 7/4) moist; very thick platy structure, extremely hard, extremely firm; few very fine and fine roots in fractures

A desert pavement of 20 to 40 percent pebbles and caliche fragments is on the surface in some areas. The depth to the indurated lime hardpan is 24 to 40 inches.

The Bt horizon is clay loam or sandy clay loam. It is 5 to 14 inches thick. Calcium carbonate content ranges from 20 to 60 percent. The lower part of the Bt horizon commonly contains lime nodules and a few gypsum crystals.

The C horizon commonly is 60 to 90 percent calcium carbonate. It is modified with 15 to 35 percent rock fragments, mostly caliche fragments. The fine earth fraction is dominantly sandy clay loam, loam, or clay loam and has strata of silty clay loam in some pedons. Gypsum crystals are in the C horizon of most pedons. The profile is moderately alkaline to very strongly alkaline.

Spring Series

The Spring series consists of very deep, moderately well drained soils on alluvial flats. These soils formed in gypsiferous lacustrine sediment. Elevation is 2,000 to 2,200 feet. Slope is 0 to 2 percent.

Typical pedon of Spring clay loam, about 650 feet north and 2,100 feet west of the southeast corner of sec. 33, T. 20 S., R. 61 E.

A11—0 to 1 inch; pale brown (10YR 6/3) clay loam, dark grayish brown (10YR 4/2) moist; moderate thick platy structure; soft, very friable, sticky and plastic; many fine vesicular pores; violently effervescent; strongly alkaline; abrupt smooth boundary

A12—1 to 5 inches; pale brown (10YR 6/3) clay loam, dark yellowish brown (10YR 4/4) moist; moderate coarse subangular blocky structure; slightly hard, very friable, sticky and plastic; common very fine fine, and medium roots, few fine and medium tubular pores and many very fine interstitial pores; violently effervescent; very strongly alkaline, abrupt smooth boundary.

C1—5 to 11 inches; light brown (7.5YR 6/4) silt loam, dark brown (7.5YR 4/4) moist; massive, slightly hard, very friable, slightly sticky and plastic; many very fine and fine roots and common medium roots, common medium tubular pores and many very fine and fine interstitial pores, violently effervescent, strongly alkaline, gradual wavy boundary

C2—11 to 29 inches; pink (7.5YR 7/4) silt loam, brown (7.5YR 5/4) moist; massive; slightly hard, very friable, slightly sticky and plastic; many very fine to medium roots and few coarse roots, many very fine, fine, and medium tubular pores and few coarse tubular pores; few fine and medium gypsum masses; violently effervescent; moderately alkaline; gradual wavy boundary

C3cs—29 to 37 inches, light yellowish brown (10YR 6/4) silty clay loam, yellowish brown (10YR 5/4) moist, massive; slightly hard, very friable, sticky and plastic; common very fine, fine, and medium roots, common very fine, fine, and medium tubular pores, many gypsum crystals, violently effervescent; moderately alkaline; gradual wavy boundary

C4cs—37 to 43 inches, light yellowish brown (10YR 6/4) silty clay loam, yellowish brown (10YR 5/4) moist; massive; slightly hard, very friable, sticky and plastic; common very fine and fine roots and few medium roots, common very fine, fine, and medium tubular pores and common very fine and fine interstitial pores, many fine gypsum crystals and few gypsum masses; violently effervescent; moderately alkaline; gradual wavy boundary.

C5—43 to 52 inches; very pale brown (10YR 7/3) silty clay loam, light yellowish brown (10YR 6/4) moist; massive; slightly hard, very friable, sticky and plastic, common very fine and fine roots; many very fine, many fine, and few medium tubular pores and many very fine and fine interstitial pores; common fine distinct strong brown (7.5YR 5/6) mottles; few fine soft lime masses, violently effervescent; moderately alkaline; gradual wavy boundary.

C6ca—52 to 60 inches; very pale brown (10YR 7/3) silty clay, light yellowish brown (10YR 6/4) moist; massive, hard, very friable, sticky and plastic; few medium roots, many very fine and fine tubular pores; common fine distinct strong brown (7.5YR 5/8) mottles; common fine and medium soft lime masses violently effervescent; moderately alkaline.

Depth to the gypsic horizon ranges from 8 to 30 inches. The particle-size control section averages clay loam, silt loam, or silty clay loam. Clay content is 25 to

35 percent. The profile is neutral to very strongly alkaline

St. Thomas Series

The St. Thomas series consists of shallow and very shallow, well drained soils on side slopes of hills and mountains. These soils formed in residuum derived from limestone and dolomite. Elevation is 2,000 to 5,000 feet. Slope is from 15 to 30 percent.

Typical pedon of a St. Thomas extremely cobbly fine sandy loam in an area of Rock outcrop-St. Thomas complex, 15 to 30 percent slopes, about 500 feet north of the southwest corner of sec. 36, T. 21 S., R. 63 E.

The surface is covered with about 30 percent pebbles, 50 percent cobbles, and 10 percent stones.

A1—0 to 1 inch; light yellowish brown (10YR 6/4) extremely cobbly fine sandy loam, brown (10YR 4/3) moist; moderate very thin platy structure; soft, very friable, nonsticky and slightly plastic; few very fine roots; common very fine interstitial pores and few very fine and fine tubular pores, 40 percent cobbles, 35 percent pebbles, and 10 percent stones; violently effervescent; strongly alkaline; abrupt wavy boundary.

C1—1 to 4 inches; light yellowish brown (10YR 6/4) extremely cobbly fine sandy loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and slightly plastic; few fine and very fine roots; common very fine interstitial pores; 30 percent cobbles and 35 percent pebbles; violently effervescent; strongly alkaline; clear wavy boundary.

C2ca—4 to 7 inches; light yellowish brown (10YR 6/4) extremely cobbly fine sandy loam, brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and slightly plastic; few very fine roots; common very fine interstitial pores; 40 percent cobbles and 40 percent pebbles; original rock structure is mostly intact; common fine and medium white (10YR 8/2) indurated lime nodules, very pale brown (10YR 7/3) moist; violently effervescent; strongly alkaline; abrupt irregular boundary.

R—7 inches; hard limestone; thick white (10YR 8/2) lime coatings on rock surfaces and in fractures.

Depth to hard bedrock ranges from 4 to 20 inches. The particle-size control section is modified with 60 to 85 percent rock fragments. The fine earth fraction averages fine sandy loam or loam; the content of clay averages 5 to 15 percent. The Cca horizon is less than 6 inches thick. Calcium carbonate content averages more than 40 percent. Reaction is moderately alkaline or strongly alkaline.

Tencee Series

The Tencee series consists of shallow and very shallow, well drained soils on erosional fan remnants. These soils formed in alluvium derived primarily from limestone and dolomite. Elevation is 2,600 to 3,600 feet. Slope is 2 to 8 percent.

Typical pedon of Tencee very gravelly fine sandy loam, 2 to 8 percent slopes, about 1,950 feet north and 2,100 feet east of the southwest corner of sec. 8, T. 19 S., R. 60 E.

About 75 percent of the surface is covered with a desert pavement of pebbles. A dark desert varnish is on the exposed surfaces of the rock fragments.

A1—0 to 2 inches, light brown (7.5YR 6/4) very gravelly fine sandy loam, dark brown (7.5YR 4/4) moist; moderate thick platy structure; soft, very friable, slightly sticky and slightly plastic; common very fine and fine roots; many very fine and fine interstitial pores; 40 percent pebbles and 5 percent cobbles, violently effervescent; moderately alkaline, abrupt smooth boundary.

C1—2 to 5 inches; light brown (7.5YR 6/4) very gravelly fine sandy loam, brown(7.5YR 5/4) moist; massive; soft, very friable, slightly sticky and slightly plastic; many fine and medium roots, many fine interstitial pores; 45 percent pebbles and 5 percent cobbles, thin lime coatings on undersides of most rock fragments; violently effervescent; moderately alkaline; abrupt wavy boundary.

C2ca—5 to 9 inches, light brown (7.5YR 6/4) very gravelly fine sandy loam, brown (7.5YR 5/4) moist, massive; soft, very friable, slightly sticky and slightly plastic, many fine and medium roots, common fine interstitial pores; 55 percent pebbles; lime coatings on undersides of pebbles, weakly cemented with lime; violently effervescent; moderately alkaline; clear wavy boundary.

C3ca—9 to 15 inches, light brown (7.5YR 6/4) very gravelly sandy loam, brown (7.5YR 5/4) moist; massive; soft, very friable, slightly sticky and slightly plastic, many fine and medium roots; 50 percent pebbles and 5 percent cobbles; thick lime coatings on undersides of rock fragments; weakly cemented with lime; few coarse irregular lime-cemented pockets, violently effervescent, moderately alkaline; abrupt wavy boundary.

C4cam—15 inches; indurated very gravelly petrocalcic horizon.

Depth to the petrocalcic horizon is 7 to 20 inches. The particle-size control section is modified with 35 to 60 percent rock fragments and is more than 40 percent calcium carbonate.

The fine earth fraction averages sandy loam, fine sandy loam, or loam and has a clay content of 10 to 20 percent.

Weiser Series

The Weiser series consists of very deep, well drained soils on erosional fan remnants. These soils formed in alluvium derived from various types of rock, mostly limestone. Elevation is 2,000 to 3,800 feet. Slope is 2 to 8 percent.

Typical pedon of Weiser extremely gravelly fine sandy loam, 2 to 8 percent slopes, about 1,100 feet south and 900 feet east of the northwest corner of sec. 21, T. 19 S., R. 62 E.

About 80 percent of the surface is covered with a desert pavement of pebbles. A dark desert varnish is on the exposed surfaces of the rock fragments.

A1—0 to 1 inch; light yellowish brown (10YR 4/3) extremely gravelly fine sandy loam, brown (10YR 4/3) moist; weak medium platy structure; soft, very friable, nonsticky and slightly plastic; few very fine roots, few very fine tubular pores and many very fine interstitial pores; 70 percent pebbles and 5 percent cobbles; very thin discontinuous lime coatings on undersides of pebbles, violently effervescent, moderately alkaline; abrupt smooth boundary

C1—1 to 5 inches, light brown (7.5YR 6/4) extremely gravelly fine sandy loam, brown (7.5YR 4/4) moist; massive; soft, very friable, nonsticky and slightly plastic, common very fine and fine roots; common very fine tubular pores; 75 percent pebbles and 2 percent cobbles; very thin discontinuous lime coatings on undersides of rock fragments, violently effervescent; moderately alkaline; clear smooth boundary

C2ca—5 to 28 inches; light brown (7.5YR 6/4) extremely gravelly fine sandy loam, brown (7.5YR 5/4) moist; massive; soft, very friable, nonsticky and slightly plastic, many very fine and common fine roots; many very fine tubular and interstitial pores, 80 percent pebbles and 2 percent cobbles; thin discontinuous coatings on undersides of rock fragments and in root channels and pores; violently effervescent; moderately alkaline; clear wavy boundary

C3ca—28 to 43 inches; light brown (7.5YR 6/4)extremely gravelly fine sandy loam, brown (7.5YR 5/4) moist, massive; hard, friable, nonsticky and slightly plastic; few very fine and fine roots, common very fine tubular pores; 55 percent pebbles and 5 percent cobbles; thin lime coatings on rock fragments, in root channels, and in pores, common fine lime nodules; weakly cemented with lime, violently effervescent; moderately alkaline; gradual wavy boundary

C4ca—43 to 57 inches; light brown (7.5YR 6/4) extremely gravelly fine sandy loam, brown (7.5YR 5/4) moist; massive; hard, very friable, nonsticky and slightly plastic; common very fine and few fine roots; common very fine tubular pores and many very fine interstitial pores; 70 percent pebbles, thin lime coatings on undersides of pebbles, weakly cemented with lime, violently effervescent; moderately alkaline, clear smooth boundary

C5ca—57 to 63 inches; light brown (7.5YR 6/4) very gravelly fine sandy loam, brown (7.5YR 5/4) moist, massive, hard, friable, slightly sticky and slightly plastic; few fine roots; common very fine tubular pores, 55 percent pebbles, thin lime coatings on pebbles, in root channels, and in pores. common fine lime nodules, weakly cemented with lime; violently effervescent, moderately alkaline.

The particle-size control section is modified with 60 to 80 percent rock fragments. The fine earth fraction averages fine sandy loam or sandy loam and has a clay content of 5 to 18 percent. Calcium carbonate content ranges from 40 to 60 percent. The profile is moderately alkaline or strongly alkaline.

Formation of the Soils

By R. P. Zimmerman, soil scientist, Soil Conservation Service

Soil is a natural, three-dimensional body on the earth's surface in which plants grow. It is a mixture of varying proportions of weathered rock fragments, minerals, organic matter, air, and water. Soil is formed by physical and chemical processes resulting from the interaction of the factors of climate, living organisms, relief, parent material, and time.

Climate

Climate has a strong influence on soil formation. Heat and moisture affect the kind and amount of plant production, the rate of organic matter decomposition, and the weathering of rocks and minerals. Wind and water move and deposit soil parent material. Rainfall contains substances such as dissolved calcium and sodium salts that influence soil formation (*5*).

The present climate of the survey area is characterized by low precipitation, low humidity, abundant sunshine, and wide extremes in daily temperature. Potential evapotranspiration exceeds precipitation in every month of most years. The natural vegetation in this climate is mainly a sparse shrub cover of creosotebush and white bursage, slightly stratified with yucca and Joshua-tree on the higher parts of the piedmont slopes. In the lowest parts of the basin, small local areas of soils that have a high water table support halophytes and phreatophytes. Production of organic matter is low in most of the survey area.

During pluvial periods of the Pleistocene, the climate of the area was probably moister and cooler than at present. At those times the soil-forming processes of leaching and eluviation were probably more effective.

Because of the low rainfall and rapid loss of moisture to evapotranspiration, moisture does not penetrate very deeply into the soils in the area. Soluble salts and the less soluble gypsum and calcium carbonate are leached downward as water moves into the soil profile, and they are precipitated as the soil dries. These minerals tend to be concentrated in the soil profile at the depth to which moisture commonly penetrates.

The sparse vegetation in this arid climate provides little protection to the soil from the effects of erosion by wind and water. The finer mineral grains are commonly removed from the soil surface by erosion. Pebbles and large rock fragments tend to be concentrated on the surface, forming an erosion pavement.

Although total precipitation in the area is low, part of it occurs during high intensity storms that release enormous amounts of energy. Runoff from rare, catastrophic storms cuts and scours the prominent drainageways that dissect the piedmont slopes. The sediment load of this runoff is deposited on the lower and younger geomorphic surfaces of the area.

A vesicular surface layer is a common soil feature of this area. The vesicles are small, round or egg-shaped cavities and are the most common pores in the surface layer of many desert soils. The vesicles are believed to be formed by the upward bubbling of trapped gases when summer rains saturate the hot surface.

Another effect of climate on soil formation in this area is the transportation of soil material by wind. Eolian dust is a source of carbonates, soluble salts, and clay minerals. Calcareous dust is transported long distances in the desert and is deposited on all surfaces. This dust is considered to be the major source of pedogenic carbonates in many soils having noncalcareous parent material such as the soils of the Hobog series (*4*).

Wind moves sand-sized particles by rolling and bouncing them along the soil surface. Sand is deposited in sheets or dunes on almost any physiographic surface. Psamments such as the Bluepoint soils commonly formed in thick deposits of eolian sand.

Living Organisms

Plants and animals are biological factors that affect soil formation. The activities of man can also be considered a biological factor.

The upper part of the surface layer of the soils in this survey area is extremely hot and dry in summer. Consequently seed germination, root growth, and other biological activity is mostly limited to brief, favorable periods following winter rains.

Under natural conditions, only a few areas adjacent to seeps and springs have had an abundant supply of moisture and have supported dense vegetation. The thick surface layer under this dense vegetation has been darkened by accumulations of organic matter and has formed the mollic epipedon typical of the Paradise soils.

Animal life such as ground squirrels, ants, and cicadas affect soil formation with their digging activities. They mix

soil horizons, increase soil porosity and increase the content of available nitrogen.

Man's activities also affect soil formation. In this survey area man has altered soil moisture regimes through irrigation and drainage. Irrigation and drainage also redistribute soluble salts in the soils. In the urban areas, the soil profile has been altered by cutting and filling and by removal of the petrocalcic horizon from some areas of the Las Vegas and Cave soils.

Another effect of man's activity in this area is the subsidence of the basin floor (*3*). This subsidence of several feet is caused by pumping of ground water for urban use and irrigation. The lowered level of the basin floor will trigger a new erosion cycle, which may accelerate erosion on upslope soils.

Relief

Relief, through its effect on runoff, erosion, drainage, and exposure to the sun and wind, has an important effect on soil formation. Relief in the survey area is illustrated by three major physiographic areas (*9*). These are (1) mountain slopes along the outer boundaries of the survey area, (2) the piedmont slopes of coalescent alluvial fan sediment; and (3) the basin floor. The elevation in the area ranges from about 1,800 feet in Las Vegas Wash to about 6,800 feet on the lower peaks of the Spring Mountains. Most of the area, however, has very little local relief. The average elevation of the basin floor is about 2,000 feet, and most of the piedmont slopes have an elevation of less than 4,000 feet.

On the steep slopes of the mountain ranges, runoff and erosion are relatively rapid. The soils are well drained to excessively drained. Removal of soil material by erosion takes place almost as rapidly as soil is formed by weathering of the parent rock; therefore, pedogenic horizons commonly are weakly expressed or are not present. Most soils in the area are shallow to bedrock and are in Lithic subgroups of the soil taxonomy. Some of the shallow soils such as those of the Akela and St. Thomas series show only a slight accumulation of organic matter in the surface layer as evidence of profile development.

Piedmont slopes are the most extensive landform in the the area. Deposition of the alluvial fan sediment that forms the piedmont slopes began in the Pliocene and Pleistocene and still continues. The piedmont slopes commonly are moderately sloping in the higher part adjacent to the mountains and gently sloping at the lower edges adjacent to the basin floor. The piedmont slopes are dissected by drainage channels, and channel erosion is apparent in most areas. The steep drainageway banks are initially reduced by side cutting. Continued sheet and rill erosion causes the banks to retreat upslope, leaving a smooth pediment surface. Cycles of erosion over long periods of time produce a series of successively higher and older geomorphic surfaces.

The lowest and youngest geomorphic surfaces on the piedmont slopes are active channels and inset fans. Soils on these surfaces, such as those of the Arizo and Jean series, do not have diagnostic horizons.

Stable remnant areas of older, higher surfaces are commonly bypassed and isolated from the active erosion or deposition of the present drainage system. Soils of these stable remnants have had time to develop pedogenic features such as the calcic horizon of the Weiser soils and the petrocalcic horizon of the Tencee soils.

The basin floor is the lowest landform in the area. It is nearly level. The basin floor includes areas of alluvial flats, areas of old lakebed deposits, and the flood plain of Las Vegas Wash. Most soils of the basin floor are characterized by slow runoff and restricted drainage. In some areas the natural drainage has been altered by pumping and irrigation. Because of restricted drainage, the soils in this part of the survey area commonly have accumulations of soluble salts. Some soils, such as those of the Land series, have a horizon with enough soluble salts to form a salic horizon. The salts in the salic horizon accumulated as the result of capillary rise from a saline water table. As water evaporates or is removed by plant roots, the dissolved salts are concentrated and precipitated.

Sodium sulfate is the principle salt in the Land soils and presents special problems for use and management of the soils. Sodium sulfate is highly corrosive to Portland cement. It also hydrates and expands under certain temperature conditions and exerts strong heaving and shearing forces on structures placed in or on these soils.

Restricted drainage is also responsible for the accumulation of organic matter in the mollic epipedon of the Paradise soils. The moist conditions have encouraged dense plant growth. In addition, the soils have been saturated for long periods, preventing rapid decay of the organic matter.

In the northwestern part of Las Vegas Valley, near Tule Spring, are dissected remnants of Pleistocene lakebed and playa deposits. The dissected deposits are mapped as Badland.

A small but conspicuous physiographic feature in the south-central part of Las Vegas Valley is a series of scarps ranging from a few feet high to nearly 150 feet high along Whitney Mesa. Exposed on the higher scarps are easily eroded Miocene lakebeds. The eroded scarps are mapped as Badland.

Another series of smaller, less conspicuous scarps downthrown to the east occur mostly to the west of Las Vegas Wash and below the 2,300 foot contour. These scarps generally are attributed to local subsidence caused by heavy pumping of ground water.

Parent Material

Parent material is the weathered rock or unconsolidated material from which soils form. The rock formations of the mountains surrounding the survey area are the original source of most of the parent material for the soils. On the east, west, and north sides of the survey area, the mountain rock is mostly limestone and dolomite with some areas of sandstone and quartzite. On the south side, volcanic flow rock is the main kind of rock (*7*).

On the mountain slopes, soils form in parent material of decomposed bedrock that has weathered in place. Akela and Hobog soils formed in residuum derived from volcanic flow rock. St. Thomas soils formed in residuum derived from weathered carbonatic rock.

The parent material for most of the soils in the survey area is unconsolidated sediment eroded from the surrounding mountains and deposited on the piedmont slopes and basin floors.

In some areas this sediment is dominantly limestone fragments, which are the major source of the carbonatic mineralogy of the Dalian and Weiser soils.

Gypsiferous sediment is the dominant parent material of the Bracken soils, which have a gypsic horizon and gypsic mineralogy. Gypsiferous sediment is also the source of the gypsic horizons of the Aztec, McCarran, and Spring soils.

Calcareous dust deposited by the wind is a component of the parent material of almost all soils in the survey area. The addition of windblown dust to the soils constantly recharges them with lime, and almost all soil profiles in the area are calcareous throughout. Calcareous dust is the probable source of lime for the calcic horizon in the Hobog soils.

Time

Time is required for soil formation to take place. The interaction of the other soil-forming factors through time produces soil characteristics such as diagnostic soil horizons and other diagnostic soil features.

The landforms of the Las Vegas Valley and the soils that formed on them vary considerably in age. The relative age of the soils may be inferred from their physiographic position and the appearance of the erosion pavement. Relative age, when considered with the other soil-forming factors, can be used to predict what soil characteristics are likely to be present and how strongly they are likely to be expressed.

The youngest landforms are areas undergoing active erosion or receiving current deposition. From areas of current deposition on the fan skirts and basin floor, a series of higher surfaces, representing successively older cycles of erosion, extends across the piedmont slopes to the mountains.

The recent sediment of the basin floors and lowest surfaces of the piedmont slopes is considered to be of Holocene age, dating from the present to about 10,000 years ago. The older, higher surfaces are considered to have been formed during the Pleistocene, or from about 10,000 to 1.8 million years ago.

An inference of the relative age of surfaces on the piedmont slopes can be made from the appearance of the erosion pavement. On soils of recent geomorphic surfaces such as those of the Arizo series, the rock fragments are loosely scattered in a random pattern.

The oldest geomorphic surfaces, which have soils with well developed diagnostic horizons, also tend to have a well developed desert pavement. The rock fragments are on the soils of the oldest surfaces such as those of the Goodsprings series. These fragments are interlocking and deeply embedded, which indicates a long period of stability with no appreciable erosion or deposition. The desert varnish of iron and manganese oxide coatings on the rock fragments is darkest and thickest on the oldest surfaces. The oxide coatings apparently are developed by wetting and drying cycles, and they form first on the tops of the rock fragments. On some old geomorphic surfaces, the varnish may cover the entire rock fragment, although this may be a result of rotation of the fragments by random events.

Some soils of the Holocene surfaces in Las Vegas Valley such as those of the Dalian, Bluepoint, and Glencarb series do not have diagnostic horizons. A few have diagnostic horizons that will form rapidly in the present climate. The salic horizon of the Land soils is an example. Gypsic horizons such as the one in the Spring soils are considered to form in a few thousand years (*10*) and are probably of Holocene age.

The abundance of lime in the parent material and the limited depth of moisture penetration favor accumulation of lime in the soils of the area. Practically all the soils are calcareous throughout. About 18 percent of the area comprises soils that have a calcic horizon, and 34 percent is soils that have a petrocalcic horizon. In areas that have similar climate and parent material, the strength of expression of the calcic horizon is related to the period of stability of the landscape surfaces.

Calcic horizons tend to develop most rapidly in gravelly parent material. Less lime accumulation is necessary to form a calcic horizon in gravelly material than in fine-grained material. In gravelly material of Holocene age, the lime accumulates first as coatings on the underside of rock fragments. The soils of the Canutio series are examples of gravelly soils that have a slight accumulation of lime. As accumulation progresses, the lime coatings extend to the sides and tops of the rock fragments, the coatings become thicker, and secondary lime extends into the interpebble material. The soils of the Weiser series are an example of soils that have a minimal calcic horizon that formed in gravelly parent material. Weiser soils are probably of late Pleistocene age. With further accumulation, the secondary lime becomes continuous in the interpebble material, some

pores are plugged with lime, and the horizon becomes weakly cemented with lime. Nickel soils are an example of soils at this stage of calcic horizon development. Nickel soils are probably of late Pleistocene age. Eventually lime accumulation progresses until the horizon is strongly cemented with lime, all pores are plugged with lime, and a petrocalcic horizon has formed. The soils of the Pittman series are an example of soils that have a petrocalcic horizon that formed in gravelly material. Pittman soils are probably of late mid-Pleistocene age.

A similar sequence of carbonate accumulation occurs in nongravelly material. The initial stage is lime accumulation in a few filaments or faint coatings on the surfaces of peds. An example is the lime accumulation in the deep layers of the Bluepoint soils. As accumulation progresses lime nodules and cylindroids form and become larger and more numerous, forming a calcic horizon. The soils of the Destazo series are an example of soils with a calcic horizon that formed in nongravelly material. They probably are of late Pleistocene or late mid-Pleistocene age. As the lime nodules are joined in a strongly cemented matrix and pores are completely plugged with lime, a petrocalcic horizon is formed. The soils of the Las Vegas series are an example of soils with a petrocalcic horizon that formed in nongravelly material. The Las Vegas soils are probably of late mid-Pleistocene age.

The moisture that penetrates to the top of a petrocalcic horizon tends to dissolve part of the horizon surface. During periods of high moisture, solution cavities form on the upper surface of the petrocalcic horizon and it begins to degrade or break up. During interpluvial periods the horizon reforms and thickens and is characterized by dense laminar depositions on the upper surface and in solution cavities. The soils of the Cave series are an example of soils with a thick petrocalcic horizon that have multiple laminar layers. They probably are of mid-Pleistocene age.

The small areas of soils that have an argillic or natric horizon in this survey area were probably formed during pluvial periods of the Pleistocene. The present climate and soil conditions are not favorable for the dispersion of clay and its movement downward in the soil profile (*6*). Soils that have an argillic horizon may have been more extensive in this area during past ages. Processes that may have destroyed a previously existing argillic horizon are soil truncation, engulfment by lime accumulation, and mixing by soil biota.

The soils of the Skyhaven series are an example of soils that have an argillic horizon. The argillic horizon is underlain by horizons of increasing lime content, and these horizons are underlain by a thick indurated petrocalcic horizon. The argillic horizon is apparently being engulfed by lime accumulation. The Skyhaven soils are probably of mid-Pleistocene age.

The soils of the Casaga series are an example of soils that have a natric horizon. These soils are on an old surface on the eastern side of Las Vegas Valley, where prevailing winds may have carried sodium salts from Pleistocene lakebeds and playas. Sodium-saturated clay is readily dispersed and moved downward in the soil profile to form a natric horizon. The natric horizon in the Casaga soils is thin and is underlain by a calcic horizon. The Casaga soils are probably of latest Pleistocene age.

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Glossary

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alkali (sodic) soil. A soil having so high a degree of alkalinity (pH 8.5 or higher), or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Alluvial. Pertaining to processes or materials associated with transportation or deposition by running water.

Alluvial cone. The material washed down the sides of mountains and hills by ephemeral streams and deposited at the mouth of gorges in the form of a moderately steep, conical mass descending equally in all directions from the point of issue.

Alluvial fan. A semiconical, or fan-shaped, constructional major landform that is mainly stratified alluvium with debris flow deposits in some areas. It is on the upper margin of a piedmont slope, and its apex is a source of alluvium debouching from a mountain valley into an intermontane basin. Also, a generic term for similar landforms in various other landscape positions.

Alluvial flat. The nearly level alluvial surface between a piedmont slope and the playa of a bolson or the axial-stream flood plain of a semibolson. This landform can include both recent and relict components.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Animal-unit-month (AUM). The amount of forage required by one mature cow of approximately 1,000 pounds weight, with or without a calf, for 1 month.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Arroyo. The flat floored channel of an ephemeral stream, commonly with very steep to vertical banks cut in alluvium.

Arroyo valley. A small valley that is tributary to a major valley of a desert stream.

Association, soil. A group of soils or miscellaneous areas geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as—

	Inches
Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	More than 12

Back slope. The geomorphic component that forms the steepest inclined surface and principal element of many hillsides. Back slopes in profile are commonly steep, are linear, and may or may not include cliff segments.

Badland. Steep or very steep, commonly nonstony, barren land dissected by many intermittent drainage channels. Badland is most common in semiarid and arid regions where streams are entrenched in soft geologic material. Local relief generally ranges from 25 to 500 feet. Runoff potential is very high, and geologic erosion is active.

Base saturation. The degree to which material having cation exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation exchange capacity.

Basin. A general term for an intermontane basin, a bolson, a semibolson, an area of centripetal drainage, or a structural depressional area.

Basin floor. The nearly level major part of a bolson or semibolson. It includes all alluvial, eolian, and erosional landforms that are lower than the piedmont slopes.

Basin-floor remnant. A generally flat-topped erosional remnant of a basin floor that has been dissected by an axial stream.

Bedding planes. Fine strata, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediment.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bolson. An internally drained intermontane basin.

Bolson floor. The nearly level major part of an internally drained basin. It includes all alluvial, eolian, and erosional landforms that are lower than the piedmont slopes.

Bottom land. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Breaks. The steep to very steep broken land at the border of an upland summit that is dissected by ravines.

Brush management. Use of mechanical, chemical, or biological methods to reduce or eliminate competition of woody vegetation to allow understory grasses and forbs to recover, or to make conditions favorable for reseeding. It increases production of forage, which reduces erosion. Brush management may improve the habitat for some species of wildlife.

Butte. An isolated small mountain or hill with steep or precipitous sides and a top variously flat, rounded, or pointed that may be a residual mass isolated by erosion or an exposed volcanic neck.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Caliche. A more or less cemented deposit of calcium carbonate in soils of warm-temperate, subhumid to arid areas. Caliche occurs as soft, thin layers in the soil or as hard, thick beds just beneath the solum, or it is exposed at the surface by erosion.

Canyon. A long, deep, narrow, very steep sided valley with high, precipitous walls in an area of high local relief.

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Catena. A sequence, or "chain," of soils on a landscape that formed in similar kinds of parent material but have different characteristics as a result of differences in relief and drainage.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity, but is more precise in meaning.

Channel. The bed of a single or braided waterway that commonly is barren of vegetation. Channels form in young alluvium. They may be enclosed by banks, or they may be splayed across a fan surface and slightly mounded above it. They may include bars and dumps, consisting of cobbles and stones. Channels, except flood plain playas, are landform elements.

Channery soil. A soil that is, by volume, more than 15 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches along the longest axis. A single piece is called a channer.

Chemical treatment. Control of unwanted vegetation by use of chemicals.

Chiseling. Tillage with an implement having one or more soil-penetrating points that loosen the subsoil and bring clods to the surface. A form of emergency tillage to control soil blowing.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Claypan. A slowly permeable soil horizon that contains much more clay than the horizons above it. A claypan is commonly hard when dry and plastic or stiff when wet.

Climax plant community. The plant community on a given site that will be established if present environmental conditions continue to prevail and the site is properly managed.

Coarse fragments. Mineral or rock particles larger than 2 millimeters in diameter.

Coarse textured soil. Sand or loamy sand.

Cobble (or cobblestone). A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

Cobbly soil material. Material that is 15 to 35 percent, by volume, rounded or partially rounded rock fragments 3 to 10 inches (7.5 to 25 centimeters) in diameter. Very cobbly soil material is 35 to 60 percent of these rock fragments, and extremely cobbly soil material is more than 60 percent.

Colluvium. Soil material, rock fragments, or both, moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex slope. Irregular or variable slope. Planning or constructing terraces, diversions, and other water-control measures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil or miscellaneous areas in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas.

Component landform. A feature of the earth's surface that is part of a major landform and was created by partial dissection of the major landform or by alluvial or eolian accretion. A component landform is the smallest type of landform that can be described as a single unit. Its morphological parts are called landform elements, and a side slope element can be subdivided into slope components.

Compressible (in tables). Excessive decrease in volume of soft soil under load.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Conglomerate. A coarse grained, clastic rock composed of rounded to subangular rock fragments more than 2 millimeters in diameter. It commonly has a matrix of sand and finer material. Conglomerate is the consolidated equivalent of gravel.

Conservation cropping system. Growing crops in combination with needed cultural and management practices. If soil improving crops and practices used in the system more than offset the soil depleting crops and deteriorating practices, then it is a good conservation cropping system. Cropping systems are needed on all tilled soils. Soil improving practices in a conservation cropping system include the use of rotations that contain grasses and legumes and the return of crop residue to the soil. Other practices include the use of green manure crops of grasses and legumes, proper tillage, adequate fertilization, and weed and pest control.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—Readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—Adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure, can be broken with difficulty between thumb and forefinger.

Soft.—When dry breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Coppice dune. A small dune of fine-grained soil material stabilized around shrubs or small trees.

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Crop residue management. Returning crop residue to the soil, which helps to maintain soil structure, organic matter content, and fertility and helps to control erosion.

Cropping system. Growing crops using a planned system of rotation and management practices.

Crown. The upper part of a tree or shrub, including the living branches and their foliage.

Cuesta. An asymmetric, homoclinal ridge capped by resistant rock layers of slight to moderate dip.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Decreasers. The most heavily grazed climax range plants. Because they are the most palatable, they are the first to be destroyed by overgrazing.

Deferred grazing. Postponing grazing or arresting grazing for a prescribed period.

Dense layer (in tables). A very firm, massive layer that has a bulk density of more than 1.8 grams per cubic centimeter. Such a layer affects the ease of digging and can affect filling and compacting.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Desert pavement. A layer of gravel or coarser fragments on a desert soil surface that was emplaced by upward movement of fragments from underlying sediment or remains after finer particles have been removed by running water or wind.

Desert stream valley. A valley cut through several desert semibolsons by a perennial, mountain-fed stream.

Desert varnish. A glossy sheen or coating on stones and gravel in arid regions.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—These soils have very high and high hydraulic conductivity and low water holding capacity. They are not suited for crop production unless irrigated.

Somewhat excessively drained.—These soils have high hydraulic conductivity and low water holding capacity. Without irrigation only a narrow range of crops can be grown, and yields are low.

Well drained.—These soils have intermediate water holding capacity. They retain optimum amounts of moisture, but they are not wet close enough to the surface or long enough during the growing season to adversely affect yields.

Moderately well drained.—These soils are wet close enough to the surface for long enough that planting or harvesting operations or yields of some field crops are adversely affected unless artificial drainage is provided. Moderately well drained soils commonly have a layer with low hydraulic conductivity, a wet layer relatively high in the profile, additions of water by seepage, or some combination of these.

Somewhat poorly drained.—These soils are wet close enough to the surface or long enough that planting or harvesting operations or crop growth is markedly restricted unless artificial drainage is provided. Somewhat poorly drained soils commonly have a layer with low hydraulic conductivity, a wet layer high in the profile, additions of water through seepage, or a combination of these.

Poorly drained.—These soils commonly are so wet at or near the surface during a considerable part of the year that field crops cannot be grown under natural conditions. Poorly drained conditions are caused by a saturated zone, a layer with low hydraulic conductivity, seepage, or a combination of these.

Very poorly drained.—These soils are wet to the surface most of the time. These soils are wet enough to prevent the growth of important crops (except rice) unless artificially drained.

Drainage, surface. Runoff, or surface flow of water, from an area.

Draw. A small stream valley, generally more open and with broader bottom land than a ravine or gulch.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Ephemeral stream. A stream, or reach of a stream, that flows only in direct response to precipitation. It receives no long-continued supply from melting snow or other source, and its channel is above the water table at all times.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, for example, fire that exposes the surface.

Erosion pavement. A layer of gravel or stones that remains on the surface after fine particles are removed by sheet or rill erosion.

Escarpment. A relatively continuous and steep slope or cliff breaking the general continuity of more gently sloping land surfaces and produced by erosion or faulting. Synonym: scarp.

Excess alkali (in tables). Excess exchangeable sodium in the soil. The resulting poor physical properties restrict the growth of plants.

Excess fines (in tables). Excess silt and clay in the soil. The soil does not provide a source of gravel or sand for construction purposes.

Excess lime (in tables). Excess carbonates in the soil that restrict the growth of some plants.

Excess salts (in tables). Excess water-soluble salts in the soil that restrict the growth of most plants.

Excess sulfur (in tables). Excessive amount of sulfur in the soil. The sulfur causes extreme acidity if the soil is drained, and the growth of most plants is restricted.

Extrusive rock. Igneous rock derived from deep-seated molten matter (magma) emplaced on the earth's surface.

Fan apron. A component landform consisting of a sheetlike mantle of relatively young alluvium that partially covers the surface of an older fan piedmont

or, in some places, an alluvial fan. A fan apron buries a pedogenic soil.

Fan piedmont. The most extensive major landform of most piedmont slopes. It is formed by the lateral coalescence of mountain-front alluvial fans into one generally smooth slope and by accretion of fan aprons. Fan piedmonts commonly are complexes of many component landforms.

Fan remnant. A generic term for a component landform that is the remainder of various older fans that have been dissected (erosional fan remnants) or partially buried (nonburied fan remnants). Erosional fan remnants have a flattish summit that consists of a relict fan surface, nonburied fan remnants consist entirely of a relict fan surface.

Fan remnant side slope. A landform element comprised of the relatively young erosional slope around the sides of an erosional fan remnant. It is composed of shoulders, back slopes, and foot slopes.

Fan skirt. A major landform comprised of laterally coalescing, small alluvial fans that originate from gullies or extend from inset fans of a fan piedmont and merge along their toe slopes with the basin floor. Fan skirts are smooth or only slightly dissected.

Fan terrace. A relict alluvial fan no longer a site of active deposition incised by younger and lower alluvial surfaces.

Fast intake (in tables). The rapid movement of water into the soil.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity*, *normal moisture capacity*, or *capillary capacity*.

Fill slope. A sloping surface consisting of excavated soil material from a road cut. It commonly is on the downhill side of the road.

Fine textured soil. Sandy clay, silty clay, and clay.

Firebreak. Area cleared of flammable material to stop or help control creeping or running fires. It also serves as a line from which to work and to facilitate the movement of men and equipment in fire fighting. Designated roads also serve as firebreaks.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flaggy soil material. Material that is, by volume, 15 to 35 percent flagstones. Very flaggy soil material is 35 to 60 percent flagstones, and extremely flaggy soil material is more than 60 percent flagstones.

Flagstone. A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist 6 to 15 inches (15 to 38 centimeters) long.

Flood plain. The transversely level floor of an axial stream of a semibolson or of a major desert stream valley that is occasionally or regularly alluviated by the stream overflowing its channel during periods of flooding.

Flood plain playa. A component landform consisting of very low gradient, barren, axial stream segments in an intermontane basin. It is subject to broad and shallow floods and is veneered with barren, fine textured sediment that crusts. A flood plain playa commonly is segmented by transverse, narrow bands of vegetation, and it may alternate with other narrow or braided channel segments.

Fluvial. Of or pertaining to rivers; produced by river action, as a fluvial plain.

Foothill. A steeply sloping upland that has relief of as much as 1,000 feet (or 300 meters) and fringes a mountain range or high-plateau escarpment.

Foot slope. The relatively gently sloping, slightly concave slope component of an erosional slope that is at the base of the back slope component. Synonym: pediment.

Forb. Any herbaceous plant not a grass or a sedge.

Fragile (in tables). A soil that is easily damaged by use or disturbance.

Frost action (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Gravel. Rounded or angular fragments of rock as much as 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, as much as 3 inches (7.6 centimeters) in diameter.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage, a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hardpan. A hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey and is

cemented by iron oxide, silica, calcium carbonate, or other substance

Head out. To form a flower head.

High-residue crops. Crops such as small grain and corn used for grain. If properly managed, residue from these crops can be used to control erosion until the next crop in the rotation is established. These crops return large amounts of organic matter to the soil.

Hill. A natural elevation of the land surface, rising as much as 1,000 feet above surrounding lowlands, commonly of limited summit area and having a well-defined outline; hillsides generally have slopes of more than 15 percent. The distinction between a hill and a mountain is arbitrary and is dependent on local usage.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an upper case letter represents the major horizons. Numbers or lower case letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the *Soil Survey Manual*. The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, alluminum, or some combination of these.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying soil material. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, the number 2 precedes the letter C.

R layer.—Consolidated rock beneath the soil. The rock commonly underlies a C horizon, but can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Igneous rock. Rock formed by solidification from a molten or partially molten state. Major varieties include plutonic and volcanic rock. Examples are andesite, basalt, and granite.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Increasers. Species in the climax vegetation that increase in amount as the more desirable plants are reduced by close grazing. Increasers commonly are the shorter plants and the less palatable to livestock.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Inset fan. The area of a flood plain of a commonly ephemeral stream that is confined between fan remnants, basin floor remnants, ballenas, or closely opposed fan toe slopes. Its transversely level cross section is evidence of alluviation of a fluve. It is wide enough that raw channels cover only a fraction of its surface.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation

application. The rate of water intake in inches per hour is expressed as follows.

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Intermittent stream. A stream, or reach of a stream, that flows for prolonged periods only when it receives ground water discharge or long, continued contributions from melting snow or other surface and shallow subsurface sources.

Invaders. On range, plants that encroach into an area and grow after the climax vegetation has been reduced by grazing. Generally, plants invade following disturbance of the surface.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are—

Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.

Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Knoll. A small, low, rounded hill rising above adjacent landforms.

Lacustrine deposit (geology). Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

Lake plain. A major landform of some bolson floors that is nearly level and consists of fine textured, stratified bottom sediment of a Pleistocene lake.

Landform element. The morphological part of a component landform.

Landslide. The rapid downhill movement of a mass of soil and loose rock, generally when wet or saturated. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

Large stones (in tables). Rock fragments 3 inches (7.5 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

Light textured soil. Sand and loamy sand.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by wind.

Low-residue crops. Crops such as corn used for silage, peas, beans, and potatoes. Residue from these crops is not adequate to control erosion until the next crop in the rotation is established. These crops return little organic matter to the soil.

Low strength. The soil is not strong enough to support loads.

Marl. An earthy, unconsolidated deposit consisting chiefly of calcium carbonate mixed with clay in approximately equal amounts.

Mechanical treatment. Use of mechanical equipment for seeding, brush management, and other management practices.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Mesa. A broad, nearly flat topped and commonly isolated upland mass characterized by summit widths that are more than the heights of bounding erosional scarps.

Metamorphic rock. Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, and fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, and silty clay loam.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the

thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Mountain. A natural elevation of the land surface, rising more than 1,000 feet above surrounding lowlands, commonly of restricted summit area (relative to a plateau) and generally having steep sides and considerable bare-rock surface. A mountain can occur as a single, isolated mass or in a group forming a chain or range.

Mountain-valley fan. A major landform that is the result of alluvial filling of a mountain valley or intramontane basin by coalescent valley-side slope fans whose toe slopes meet from either side of the valley along an axial drainageway. It is an extension of the upper piedmont slope into mountain valleys. Most mountain-valley fans have been dissected.

Mudstone. Sedimentary rock formed by induration of silt and clay in approximately equal amounts.

Munsell notation. A designation of color by degrees of the three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color of 10YR hue, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Observed rooting depth. Depth to which roots have been observed to penetrate.

Open space. A relatively undeveloped green or wooded area provided mainly within an urban area to minimize feelings of congested living.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan*.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pediment. The foot slope component of an erosional slope.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affecting the specified use.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plain. A flat, undulating or rolling area, large or small, that includes few prominent hills or valleys. It generally is at a low elevation in relation to surrounding areas, and it may have considerable overall slope and local relief.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plateau. An extensive upland mass with relatively flat summit area that is considerably elevated (more than 100 meters) above adjacent lowlands and separated from them on one or more sides by escarpments.

Playa. An ephemerally flooded, barren area on a basin floor that is veneered with fine textured sediment and acts as a temporary or final sink for drainage water.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. The water can be removed only by percolation or evapotranspiration.

Poor filter (in tables). Because of rapid permeability or an impermeable layer near the surface, the soil may not adequately filter effluent from a waste disposal system.

Poor outlets (in tables). Refers to areas where surface or subsurface drainage outlets are difficult or expensive to install.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Potential native plant community. The plant community on a given site that will be established if present environmental conditions continue to prevail and the site is properly managed. (See climax plant community.)

Potential rooting depth (effective rooting depth). Depth to which roots could penetrate if the content of moisture in the soil were adequate. The soil has no properties restricting the penetration of roots to this depth.

Prescribed burning. The application of fire to land under such conditions of weather, soil moisture, and time of day as presumably will result in the intensity of heat and spread required to accomplish specific forest management, wildlife, grazing, or fire hazard reduction purposes.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Proper grazing use. Grazing at an intensity that maintains enough cover to protect the soil and maintain or improve the quantity and quality of the desirable vegetation. This increases the vigor and reproduction of the key plants and promotes the accumulation of litter and mulch necessary to conserve soil and water.

Rangeland. Land on which the potential natural vegetation is predominantly grasses, grasslike plants, forbs, or shrubs suitable for grazing or browsing. It includes natural grasslands, savannas, many wetlands, some deserts, tundras, and areas that support certain forb and shrub communities.

Range condition. The present composition of the plant community on a range site in relation to the potential natural plant community for that site. Range condition is expressed as excellent, good, fair, or poor on the basis of how much the present plant community has departed from the potential.

Range site. An area of rangeland where climate, soil, and relief are sufficiently uniform to produce a distinct natural plant community. A range site is the product of all the environmental factors responsible for its development. It is typified by an association of species that differ from those on other range sites in kind or proportion of species or total production.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed as—

	pH
Extremely acid	Below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Relict. Old, or remaining from previous times; in the present context, of Pleistocene age.

Relief. The elevations or inequalities of a land surface, considered collectively.

Remnant. The remainder of a larger landform or of a land surface that has been dissected or partially buried.

Residuum (residual soil material). Unconsolidated, weathered, or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Ridgeline remnant. A narrow ridge that has a fully rounded crest and is accordant with the crests of similar, nearby ridges. Together these accordant crests approximately mark the position of a preexisting land surface that has been destroyed by dissection.

Rill. A steep sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Rippable. Bedrock or hardpan can be excavated using a single-tooth ripping attachment mounted on a tractor with a 200-300 draw bar horsepower rating.

Road cut. A sloping surface produced by mechanical means during road construction. It is commonly on the uphill side of the road.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Root zone. The part of the soil that can be penetrated by plant roots.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Saline soil. A soil containing soluble salts in an amount that impairs growth of plants. A saline soil does not contain excess exchangeable sodium.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sand dune. A component landform made up of eolian, sand-sized mineral particles. Dunes commonly are on the leeward side of a Pleistocene lakebed.

Sand sheet. A major landform comprising an extensive, several-foot-thick layer of eolian sand from pluvial lake beaches, sometimes partly redeposited by water. It is spread across alluvial flats, onto piedmont slopes, or even over low mountains and has an undulating and commonly duned surface.

Sandstone. Sedimentary rock containing dominantly sand-size particles.

Saprolite (soil science). Unconsolidated residual material underlying the soil and grading to hard bedrock below.

Scarification. The act of abrading, scratching, loosening, crushing, or modifying the surface to increase water absorption or to provide a more tillable soil.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Semibolson. An externally drained intermontane basin.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and runoff water.

Shoulder. The convex slope component at the top of an erosional side slope.

Shrink-swell (in tables). The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Side slope. The erosional slope around the sides of an erosional fan remnant, hill, ballena, mountain, etc. It is composed of shoulders, back slopes, foot slopes, and toe slopes. Also, the planimetrically linear parts of the slopes around a digitately dissected fan remnant or hill, or other landform, as compared with the planimetrically convex nose slope and concave head slope parts.

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

Silica-sesquioxide ratio. The ratio of the number of molecules of silica to the number of molecules of alumina and iron oxide. The more highly weathered soils or their clay fractions in warm-temperate, humid regions, and especially those in the tropics, generally have a low ratio.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Sinkhole. A depression in the landscape where limestone has been dissolved.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slick spot. A small area of soil having a puddled, crusted, or smooth surface and an excess of exchangeable sodium. The soil is generally silty or clayey, is slippery when wet, and is low in productivity.

Slippage (in tables). Soil mass susceptible to movement downslope when loaded, excavated, or wet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slope (in tables). Slope is great enough that special practices are required to insure satisfactory performance of the soil for a specific use.

Slow intake (in tables). The slow movement of water into the soil.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.5 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Sodic (alkali) soil. A soil having so high a degree of alkalinity (pH 8.5 or higher), or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Sodicity. The degree to which a soil is affected by exchangeable sodium. Sodicity is expressed as a

sodium absorption ratio (SAR) of a saturation extract, or the ratio of Na^+ to Ca^{++} + Mg^{++}. The degrees of sodicity are—

	SAR
Slight	Less than 13:1
Moderate	13-30:1
Strong	More than 30:1

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes of separates recognized in the United States are as follows:

	Millimeters
Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Stone line. A concentration of coarse fragments in a soil. Generally it is indicative of an old weathered surface. In a cross section, the line may be one fragment or more thick. It generally overlies material that weathered in place and is overlain by recent sediment of variable thickness.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 6 to 15 inches (15 to 38 centimeters) in length if flat.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stream terrace. A transversely level erosional fan remnant, hill, mountain, or other landform. The term is used both for a landform element and a slope component.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from wind and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Tilling a soil below normal plow depth, ordinarily to shatter a hardpan or claypan.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the E horizon. Generally refers to a leached horizon lighter in color and lower in content of organic matter than the overlying surface layer.

Summit. The flattish top of an erosional fan remnant, hill, mountain, or other landform. The term is used for both a landform and a slope component.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Tail water. The water just downstream of a structure.

Talus. Rock fragments of any size or shape, commonly coarse and angular, derived from and lying at the base of a cliff or very steep, rock slope. The accumulated mass of such loose, broken rock formed chiefly by falling, rolling, or sliding.

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

Terrace. Any part of a general slope that stands above a short, steep scarp and has a generally flat, nearly level or gently sloping summit. It may have another short scarp above the summit. Synonym: bench.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). Otherwise suitable soil material too thin for the specified use.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toe slope. The lowest part of a foot slope component of an erosional slope. It is distinguished from the

upper part of a foot slope by a greater accumulation of pedisediment. Also, the lowest and most gently sloping part of a slope

Too arid (in tables). The soil is dry most of the time, and vegetation is difficult to establish.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining

Toxicity (in tables). Excessive amount of toxic substances, such as sodium or sulfur, that severely hinder establishment of vegetation or severely restrict plant growth.

Trace elements. Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, are in soils in extremely small amounts. They are essential to plant growth

Tuff. A compacted deposit that is 50 percent or more volcanic ash and dust

Unstable fill (in tables). Risk of caving or sloughing on banks of fill material

Upland (geology) Land at a higher elevation, in general, than the alluvial plain or stream terrace land above the lowlands along streams

Valley. An elongated depressional area cut by stream erosion and the associated water erosion of its side slopes (stream valley). Also used for intermontane basins

Valley fill. In glaciated regions, material deposited in stream valleys by glacial melt water In nonglaciated regions, alluvium deposited by heavily loaded streams.

Variant, soil. A soil having properties sufficiently different from those of other known soils to justify a new series name, but occurring in such a limited geographic area that creation of a new series is not justified

Variegation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis at which a plant (specifically sunflower) wilts so much that it does not recover when placed in a humid, dark chamber

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

[Recorded in the period 1951-78 at Las Vegas, Nevada]

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average	2 years in 10 will have--		Average number of growing degree days[1]	Average	2 years in 10 will have--		Average number of days with 0.10 inch or more	Average snowfall
				Maximum temperature higher than--	Minimum temperature lower than--			Less than--	More than--		
	°F	°F	°F	°F	°F	Units	In	In	In		In
January----	56.2	32.8	44.5	72	18	168	0.41	---	0.69	2	0.6
February---	62.4	37.6	50.0	79	22	291	0.41	---	0.68	1	0.0
March------	68.4	42.2	55.3	87	27	474	0.37	---	0.63	1	0.0
April------	77.1	49.7	63.4	94	35	702	0.22	---	0.37	1	0.0
May--------	87.6	59.1	73.3	104	42	1,032	0.20	---	0.35	1	0.0
June-------	98.5	68.5	83.5	113	52	1,305	0.10	---	0.15	0	0.0
July-------	104.4	75.9	90.2	114	64	1,556	0.44	0.02	0.75	1	0.0
August-----	102.0	73.9	88.0	112	61	1,488	0.50	0.02	0.85	1	0.0
September--	94.4	65.4	79.9	107	51	1,197	0.34	---	0.57	1	0.0
October----	81.4	53.4	67.4	98	37	849	0.26	---	0.45	1	0.0
November---	66.0	41.1	53.6	82	27	408	0.46	0.02	0.78	1	0.2
December---	56.6	33.4	45.0	72	20	181	0.35	---	0.59	1	0.1
Yearly:											
Average--	79.6	52.8	66.2	---	---	---	---	---	---	---	---
Extreme--	---	---	---	115	16	---	---	---	---	---	---
Total----	---	---	---	---	---	9,651	4.06	2.15	5.82	12	0.9

[1] A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50° F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

[Recorded in the period 1951-78 at Las Vegas, Nevada]

Probability	Temperature		
	24° F or lower	28° F or lower	32° F or lower
Last freezing temperature in spring			
1 year in 10 later than--	March 3	March 23	April 6
2 years in 10 later than--	February 20	March 13	March 28
5 years in 10 later than--	January 29	February 21	March 12
First freezing temperature in fall.			
1 year in 10 earlier than--	November 28	November 13	November 6
2 years in 10 earlier than--	December 5	November 21	November 11
5 years in 10 earlier than--	December 19	December 6	November 21

TABLE 3.--GROWING SEASON

[Recorded in the period 1912-77 at Las Vegas, Nevada]

Probability	Length of growing season if daily minimum temperature exceeds---		
	24° F	28° F	32° F
	Days	Days	Days
9 years in 10	283	251	223
8 years in 10	297	263	233
5 years in 10	323	287	253
2 years in 10	349	311	274
1 year in 10	363	323	284

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
105	McCullough-Jean-Bluepoint complex, 0 to 4 percent slopes	813	0.2
107	Arizo extremely stony loam, 0 to 4 percent slopes	3,458	0.7
112	Arizo very gravelly loamy sand, flooded, 0 to 4 percent slopes	3,704	0.8
[illegible]	[illegible] very gravelly fine sandy loam, gypsiferous substratum, 2 to 8 percent slopes	466	[illegible]
[illegible]	[illegible] very gravelly fine sandy loam, 2 to 8 percent slopes	5,014	[illegible]
120	Bluepoint fine sandy loam, wet, 0 to 2 percent slopes	670	0.1
127	Bluepoint loamy fine sand, 0 to 2 percent slopes	1,224	0.3
128	Bluepoint gravelly loamy fine sand, 2 to 4 percent slopes	4,871	1.0
129	Bluepoint loamy fine sand, 4 to 15 percent slopes	662	0.1
130	Bracken-Destazo complex, 2 to 15 percent slopes	1,706	0.4
132	Bracken very gravelly fine sandy loam, 2 to 8 percent slopes	1,460	0.3
133	Bracken-Rock outcrop complex, 8 to 30 percent slopes	467	0.1
134	Bracken very gravelly fine sandy loam, 4 to 30 percent slopes	1,287	0.3
140	Casaga very gravelly sandy clay loam, 0 to 8 percent slopes	2,169	0.5
150	Cave very stony sandy loam, 0 to 4 percent slopes	11,120	2.3
151	Cave loamy fine sand, 2 to 8 percent slopes	1,416	0.3
152	Cave gravelly fine sandy loam, 0 to 4 percent slopes	58,246	12.2
155	Cave gravelly fine sandy loam, 4 to 15 percent slopes	23,668	5.0
160	Destazo cobbly fine sandy loam, 0 to 2 percent slopes	365	0.1
181	Caliza-Pittman extremely stony fine sandy loams, 2 to 8 percent slopes	1,719	0.4
182	Caliza-Pittman-Arizo complex, 0 to 8 percent slopes	5,998	1.3
183	Caliza very cobbly loamy sand, 4 to 8 percent slopes	3,299	0.7
[illegible]	Caliza very gravelly sandy loam, 2 to 8 percent slopes	6,045	[illegible]
187	Caliza extremely cobbly fine sandy loam, 2 to 8 percent slopes	5,485	1.2
190	Dalian very gravelly fine sandy loam, 2 to 4 percent slopes	5,651	1.2
191	Dalian very cobbly fine sandy loam, 2 to 8 percent slopes	6,918	1.5
192	Dalian-McCullough complex, 0 to 4 percent slopes	5,385	1.1
200	Glencarb silt loam	13,123	2.8
206	Glencarb silt loam, flooded	800	0.2
222	Glencarb silty clay loam, wet	433	0.1
236	Glencarb very fine sandy loam, saline	5,460	1.1
237	Glencarb very fine sandy loam, hardpan substratum	846	0.2
240	Goodsprings gravelly fine sandy loam, 2 to 4 percent slopes	16,942	3.6
252	Grapevine very fine sandy loam, 0 to 2 percent slopes	450	0.1
255	Grapevine loamy fine sand, 2 to 4 percent slopes	4,961	1.0
260	Jean gravelly loamy fine sand, 2 to 4 percent slopes	8,341	1.8
262	Jean Goodsprings complex, 2 to 4 percent slopes	5,538	1.2
263	Jean complex, 2 to 4 percent slopes	7,057	1.5
264	Jean very gravelly loamy fine sand, 2 to 4 percent slopes	1,228	0.3
270	Land silt loam, drained	5,245	1.1
278	Land very fine sandy loam, wet	903	0.2
282	Land silty clay loam	2,529	0.6
300	Las Vegas gravelly fine sandy loam, 0 to 2 percent slopes	13,529	2.9
301	Las Vegas gravelly fine sandy loam, 2 to 4 percent slopes	1,296	0.3
302	Las Vegas-McCarran-Grapevine complex, 0 to 4 percent slopes	9,228	1.9
305	Las Vegas-Destazo complex, 0 to 2 percent slopes	20,271	4.3
307	Las Vegas-Skyhaven complex, 0 to 4 percent slopes	618	0.1
325	McCarran fine sandy loam, 0 to 4 percent slopes	18,806	4.0
326	McCarran very cobbly fine sandy loam, 2 to 8 percent slopes	626	0.1
341	Paradise silt loam	1,321	0.3
360	Rock outcrop-St. Thomas complex, 15 to 30 percent slopes	51,085	10.8
380	Skyhaven very fine sandy loam, 0 to 4 percent slopes	3,208	0.7
390	Spring clay loam	2,373	0.5
400	Tencee very gravelly fine sandy loam, 2 to 8 percent slopes	8,519	1.8
415	Aztec very gravelly sandy loam, 2 to 8 percent slopes	4,877	1.0
417	Aztec-Rock outcrop complex, 8 to 30 percent slopes	1,282	0.3
418	Aztec-Nickel-Knob Hill complex, 2 to 15 percent slopes	820	0.2
419	Aztec-Bracken complex, 4 to 30 percent slopes	4,009	0.8
430	Knob Hill loamy sand, 0 to 4 percent slopes	4,043	0.8
440	Nickel very gravelly fine sandy loam, bedrock substratum, 2 to 8 percent slopes	904	0.2
[illegible]	[illegible]	649	[illegible]
481	Hobog loamy fine sand, 15 to 50 percent slopes	637	0.1
484	Hobog very cobbly fine sandy loam, 15 to 50 percent slopes	3,672	0.8
500	Canutio-Akela complex, 2 to 15 percent slopes	2,312	0.5
501	Canutio gravelly fine sandy loam, 0 to 2 percent slopes	468	0.1
502	Canutio-Cave gravelly fine sandy loams, 2 to 8 percent slopes	9,226	1.9
505	Canutio-Akela complex, 15 to 50 percent slopes	2,269	0.5
510	Akela-Rock outcrop complex, 15 to 50 percent slopes	11,269	2.4
540	Weiser extremely gravelly fine sandy loam, 2 to 8 percent slopes	37,633	7.9

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS--Continued

Map symbol	Soil name	Acres	Percent
542	Weiser-Aztec complex, 2 to 8 percent slopes	2,977	0.6
545	Weiser-Goodsprings complex, 2 to 4 percent slopes	726	0.1
600	Slickens	1,502	0.3
605	Dumps	259	0.1
610	Pits, gravel	3,322	0.7
615	Urban land	6,293	1.3
630	Badland	3,775	0.8
635	Rock outcrop, limestone	815	0.2
640	Rock outcrop, sandstone	710	0.1
645	Pits, quarry	916	0.2
	Total	473,391	100.0

TABLE 5.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES

[Only the soils that support rangeland vegetation suitable for grazing are listed]

Soil name and map symbol	Range site name	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Composition
			Lb/acre		Pct
105*:					
McCullough	Limy Upland, 3-6" p.z. (30-19)	Favorable	200	Creosotebush	35
		Normal	100	White bursage	20
		Unfavorable	50	Big galleta	10
				Indian ricegrass	5
				Fremont dalea	5
				Bladdersage	5
Jean	Sandy Upland, 3-6" p.z (30-37)	Favorable	300	Creosotebush	25
		Normal	150	Big galleta	20
		Unfavorable	50	White bursage	10
				Indian ricegrass	10
				Ephedra	5
				Bladdersage	5
Bluepoint	Sandy Upland, 3-6" p.z. (30-37)	Favorable	300	Creosotebush	25
		Normal	150	Big galleta	2
		Unfavorable	50	White bursage	10
				Indian ricegrass	10
				Sand dropseed	5
				Bladdersage	5
107 Arizo	Limy Upland, 3-6" p.z. (30-19)	Favorable	200	Creosotebush	40
		Normal	100	White bursage	20
		Unfavorable	50	Big galleta	5
				Indian ricegrass	5
				Fremont dalea	5
112 Arizo	Wash, 3-13" p.z. (30-28)	Favorable	600	Creosotebush	30
		Normal	400	Big galleta	10
		Unfavorable	200	White bursage	5
				Indian ricegrass	5
				White burrobrush	5
				Pricklypear	5
113 Arizo	Limy Upland, 3-6" p.z. (30-19)	Favorable	200	Creosotebush	40
		Normal	100	White bursage	20
		Unfavorable	50	Big galleta	10
				Fremont dalea	5
				Indian ricegrass	5
117 Arizo	Limy Upland, 3-6" p.z. (30-19)	Favorable	200	Creosotebush	40
		Normal	100	White bursage	20
		Unfavorable	50	Big galleta	5
				Fremont dalea	5
				Bladdersage	5
120 Bluepoint	Saline Bottom, 3-13" p.z. (30-24)	Favorable	1,600	Alkali sacaton	30
		Normal	900	Inland saltgrass	15
		Unfavorable	300	Big saltbush	10
				Fourwing saltbush	5
				Big galleta	5
				Baltic rush	5
127, 128 Bluepoint	Sandy Upland, 3-6" p.z. (30-37)	Favorable	300	Creosotebush	25
		Normal	150	Big galleta	20
		Unfavorable	50	White bursage	10
				Indian ricegrass	10
				Sand dropseed	5
				Bladdersage	5

See footnote at end of table.

TABLE 5.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Compo sition
			Lb/acre		Pct
129: [illegible]	[illegible]	Favorable	[illegible]	Creosotebush	[illegible]
		Normal	[illegible]	White bursage	[illegible]
		Unfavorable	50	Ephedra	5
				Indian ricegrass	5
				Catclaw	5
13[illegible]*:					
Bracken	Gyp Upland, 3-9" p.z. (30-26)	Favorable	100	Fremont dalea	30
		Normal	[illegible]	Desert holly	15
		Unfavorable	10	Creosotebush	10
				Sandpaper plant	10
				Shadscale	5
				Indian ricegrass	5
Destazo	Limy Upland, 3-6" p.z. (30-19)	Favorable	200	Creosotebush	30
		Normal	[illegible]	White bursage	[illegible]
		Unfavorable	50	Bladdersage	5
				Shadscale	5
				Big galleta	5
132: Bracken	Gyp Upland, 3-9" p.z. (30-26)	Favorable	100	Fremont dalea	30
		Normal	50	Desert holly	15
		Unfavorable	10	Creosotebush	10
				Sandpaper plant	10
				Shadscale	5
				Indian ricegrass	5
133*:					
Bracken	Gyp Upland, 3-9" p.z. (30-26)	Favorable	100	Fremont dalea	30
		Normal	[illegible]	[illegible]	15
		Unfavorable	10	Creosotebush	10
				Sandpaper plant	10
				Shadscale	5
				Indian ricegrass	5
Rock outcrop.					
134: Bracken	Gyp Upland, 3-9" p.z. (30-26)	Favorable	100	Fremont dalea	30
		Normal	50	Desert holly	15
		Unfavorable	10	Creosotebush	10
				Sandpaper plant	10
				Shadscale	5
				Indian ricegrass	5
1[illegible]: [illegible]	Sodic Upland, 3-6" p.z. (30-30)	Favorable	200	Shadscale	40
		Normal	[illegible]	Creosotebush	5
		Unfavorable	50	Indian ricegrass	5
				Globemallow	5
				Pale wolfberry	5
				Ephedra	5
1[illegible]: Cave	Limy Upland, 3-6" p.z. (30-19)	Favorable	200	Creosotebush	40
		Normal	[illegible]	White bursage	20
		Unfavorable	50	Bladdersage	5
				Big galleta	5
				Shadscale	5
151: Cave	Sandy Upland, 3-6" p.z. (30-37)	Favorable	300	Creosotebush	25
		Normal	[illegible]	White bursage	[illegible]
		Unfavorable	50	Big galleta	10
				Indian ricegrass	10
				Ephedra	5
				Sand dropseed	5
				Mohave yucca	5
				Bladdersage	5

See footnote at end of table.

TABLE 5.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Composition
			Lb/acre		Pct
15[illegible], 1[illegible]5: Cave	Limy Upland, 3-6" p.z. (30-19)	Favorable	200	Creosotebush	40
		Normal	100	White bursage	2[illegible]
		Unfavorable	50	Big galleta	10
				Indian ricegrass	5
160: Destazo	Limy Upland, 3-6" p.z. (30-19)	Favorable	200	Creosotebush	30
		Normal	100	White bursage	10
		Unfavorable	50	Bladdersage	5
				Shadscale	5
				Big galleta	5
181*: Caliza	Limy Upland, 3-6" p.z. (30-19)	Favorable	200	Creosotebush	40
		Normal	[illegible]	White bursage	2[illegible]
		Unfavorable	50	Big galleta	10
				Range ratany	5
				Pricklypear	5
Pittman	Limy Upland, 3-6" p.z. (30-19)	Favorable	200	Creosotebush	40
		Normal	1[illegible]	White bursage	20
		Unfavorable	50	Big galleta	10
				Rabbitbrush	5
				Fremont dalea	5
				Indian ricegrass	5
182*: Caliza	Limy Upland, 3-6" p.z. (30-19)	Favorable	200	Creosotebush	40
		Normal	1[illegible]	White bursage	20
		Unfavorable	50	Big galleta	10
				Range ratany	5
				Pricklypear	5
Pittman	Limy Upland, 3-6" p.z. (30-19)	Favorable	2[illegible]	Creosotebush	[illegible]
		Normal	100	White bursage	2[illegible]
		Unfavorable	50	Big galleta	1[illegible]
				Rabbitbrush	5
				Fremont dalea	[illegible]
				Indian ricegrass	5
Arizo	Wash, 3-13" p.z. (30-28)	Favorable	600	Creosotebush	30
		Normal	400	White bursage	2[illegible]
		Unfavorable	200	Big galleta	[illegible]
				Indian ricegrass	5
				White burrobrush	5
				Pricklypear	5
183, [illegible]4, 18[illegible]: Caliza	Limy Upland, 3-6" p.z. (30-19)	Favorable	200	Creosotebush	40
		Normal	100	White bursage	20
		Unfavorable	50	Big galleta	[illegible]
				Range ratany	5
				Pricklypear	5
[illegible]90, 191: Dalian	Limy Upland, 3-6" p.z. (30-19)	Favorable	200	Creosotebush	[illegible]
		Normal	100	White bursage	20
		Unfavorable	50	Big galleta	10
				Range ratany	5
192*: Dalian	Limy Upland, 3-6" p.z. (30-19)	Favorable	200	Creosotebush	40
		Normal	[illegible]	White bursage	2[illegible]
		Unfavorable	50	Big galleta	10
				Range ratany	5

See footnote at end of table.

TABLE 5.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Composition
			Lb/acre		Pct
192*: McCullough	Limy Upland, 3-6" p.z. (30-19)	Favorable	200	Creosotebush	40
		Normal	100	White bursage	20
		Unfavorable	50	Big galleta	10
				Fremont dalea	5
				Indian ricegrass	5
200 Glencarb	Loamy Bottom, 3-13" p.z. (30-20)	Favorable	3,000	Big galleta	40
		Normal	1,300	Creosotebush	15
		Unfavorable	800	Fourwing saltbush	10
				Big saltbush	5
				Alkali sacaton	5
206, 222 Glencarb	Saline Bottom, 3-13" p.z. (30-24)	Favorable	1,600	Alkali sacaton	40
		Normal	900	Inland saltgrass	15
		Unfavorable	300	Big saltbush	10
				Rush	5
				Fourwing saltbush	5
				Iodinebush	5
236 Glencarb	Sodic Terrace, 3-13" p.z. (30-40)	Favorable	800	Shadscale	25
		Normal	650	Wolfberry	20
		Unfavorable	200	Cattle saltbush	10
				Fourwing saltbush	10
				Alkali sacaton	10
				Inland saltgrass	5
				Iodinebush	5
				Desertholly	5
237 Glencarb	Limy Upland, 3-6" p.z. (30-19)	Favorable	200	Creosotebush	40
		Normal	175	White bursage	20
		Unfavorable	50	Big galleta	10
				Shadscale	5
				Indian ricegrass	5
				Bladdersage	5
240 Goodsprings	Limy Upland, 3-6" p.z. (30-19)	Favorable	200	Creosotebush	40
		Normal	100	White bursage	20
		Unfavorable	50	Big galleta	10
				Ephedra	5
				Indian ricegrass	5
252 Grapevine	Limy Upland, 3-6" p.z. (30-19)	Favorable	200	Creosotebush	40
		Normal	100	White bursage	20
		Unfavorable	50	Big galleta	10
				Shadscale	5
				Indian ricegrass	5
				Dalea	5
255 Grapevine	Limy Upland, 3-6" p.z. (30-19)	Favorable	200	Creosotebush	40
		Normal	100	Big galleta	10
		Unfavorable	50	White bursage	20
				Indian ricegrass	5
				Ephedra	5
260 Jean	Sandy Upland, 3-6" p.z. (30-37)	Favorable	300	Creosotebush	25
		Normal	150	Big galleta	20
		Unfavorable	50	White bursage	10
				Indian ricegrass	10
				Ephedra	5
				Bladdersage	5

See footnote at end of table.

TABLE 5.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Composition
			Lb/acre		Pct
262*:					
Jean	Sandy Upland, 3-6" p.z. (30-37)	Favorable	300	Creosotebush	25
		Normal	150	Big galleta	20
		Unfavorable	50	White bursage	10
				Indian ricegrass	10
				Ephedra	5
				Bladdersage	5
Jean	Wash, 3-13" p.z. (30-28	Favorable	650	Creosotebush	30
		Normal	400	White bursage	20
		Unfavorable	200	Big galleta	15
				Indian ricegrass	5
				White burrobrush	5
				Range ratany	5
				Baccharis	5
Goodsprings	Limy Upland, 3-6" p.z. 30-19)	Favorable	200	Creosotebush	40
		Normal	100	White bursage	20
		Unfavorable	50	Big galleta	10
				Ephedra	5
				Indian ricegrass	5
263*:					
Jean	Sandy Upland, 3-6" p.z. (30-37)	Favorable	300	Creosotebush	25
		Normal	150	Big galleta	20
		Unfavorable	50	White bursage	10
				Indian ricegrass	10
				Ephedra	5
				Bladdersage	5
Jean	Wash, 3-13" p.z. (30-28)	Favorable	650	Creosotebush	30
		Normal	400	White bursage	20
		Unfavorable	200	Big galleta	15
				Indian ricegrass	5
				White burrobrush	5
				Range ratany	5
				Baccharis	5
264 Jean	Sandy Upland, 3-6" p.z. (30-37)	Favorable	300	Creosotebush	25
		Normal	150	Big galleta	20
		Unfavorable	50	White bursage	10
				Indian ricegrass	10
				Ephedra	5
				Bladdersage	5
270 Land	Sodic Terrace, 3-13" p.z. (30-40)	Favorable	800	Shadscale	25
		Normal	650	Wolfberry	20
		Unfavorable	200	Alkali sacaton	10
				Fourwing saltbush	10
				Cattle saltbush	10
				Inland saltgrass	5
				Iodinebush	5
				Desertholly	5
278 Land	Saline Meadow, 3-13" p.z. (30-23)	Favorable	3,000	Alkali sacaton	35
		Normal	1,500	Inland saltgrass	15
		Unfavorable	1,000	Baltic rush	10
				Rush	10
				Sedge	5
				Rubber rabbitbrush	5
				Dock	5

See footnote at end of table.

TABLE 5.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Composition
			Lb/acre		Pct
282: Land	Saline Bottom, [illegible] p.z. 30-24	Favorable	1,[illegible]	Alkali sacaton	[illegible]
		Normal	[illegible]	Inland saltgrass	15
		Unfavorable	[illegible]	Big saltbush	[illegible]
				Fourwing saltbush	10
				Rush	5
				Iodinebush	5
300, 301: Las Vegas	Limy Upland, 3-6" p.z. (30-19)	Favorable	[illegible]	Creosotebush	[illegible]
		Normal	100	White bursage	20
		Unfavorable	50	Big galleta	10
				Shadscale	5
				Ephedra	5
				Indian ricegrass	5
302*: Las Vegas	Limy Upland, 3-6" p.z. (30-19)	Favorable	200	Creosotebush	40
		Normal	[illegible]	White bursage	[illegible]
		Unfavorable	50	Big galleta	10
				Shadscale	5
				Ephedra	5
				Indian ricegrass	5
McCarran	Limy Gyp Upland, 3-6" p.z. 3[illegible]-31	Favorable	100	Deserthglly	45
		Normal	[illegible]	Fremont dalea	[illegible]
		Unfavorable	25	Seepweed	10
				Bearpoppy	5
Grapevine	Limy Upland, 3-6" p.z. (30-19)	Favorable	[illegible]	Creosotebush	[illegible]
		Normal	[illegible]	White bursage	[illegible]
		Unfavorable	50	Big galleta	10
				Shadscale	5
				Indian ricegrass	5
				Dalea	5
[illegible]*: Las Vegas	Limy Upland, 3-6" p.z. (30-19)	Favorable	200	Creosotebush	40
		Normal	100	White bursage	20
		Unfavorable	50	Big galleta	10
				Shadscale	5
				Ephedra	5
				Indian ricegrass	5
Destazo	Limy Upland, 3-6" p.z. (30-19)	Favorable	200	Creosotebush	40
		Normal	[illegible]	White bursage	[illegible]
		Unfavorable	40	Big galleta	[illegible]
				Shadscale	5
				Indian ricegrass	5
				Ephedra	5
317*: Las Vegas	Limy Upland, 3-6" p.z. (30-19)	Favorable	[illegible]	Creosotebush	[illegible]
		Normal	[illegible]	White bursage	[illegible]
		Unfavorable	[illegible]	Big galleta	[illegible]
				Shadscale	5
				Ephedra	5
				Indian ricegrass	5
Skyhaven	Sodic Upland, 3-6" p.z. 30-30	Favorable	200	Shadscale	40
		Normal	100	[illegible]	[illegible]
		Unfavorable	50	Seepweed	5
				Ephedra	5
				Indian ricegrass	5

See footnote at end of table.

TABLE 5.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Composition
			Lb/acre		Pct
325, 326 McCarran	Limy Gyp Upland, 3-6" p.z. (30-31)	Favorable	100	Desertholly	45
		Normal	50	Fremont dalea	15
		Unfavorable	25	Seepweed	10
				Indian ricegrass	5
				California bearpoppy	5
341 Paradise	Saline Meadow, 3-13" p.z. (30-23)	Favorable	3,000	Alkali sacaton	30
		Normal	1,500	Inland saltgrass	15
		Unfavorable	1,000	Baltic rush	15
				Rush	10
				Sedge	5
				Rubber rabbitbrush	5
360*: Rock outcrop.					
St. Thomas	Limy Hill, 3-6" p.z. (30-17)	Favorable	125	Creosotebush	40
		Normal	75	White bursage	20
		Unfavorable	25	Big galleta	10
				Ephedra	5
380 Skyhaven	Sodic Upland, 3-6" p.z. (30-30)	Favorable	200	Shadscale	40
		Normal	100	Creosotebush	[illegible]
		Unfavorable	50	Seepweed	[illegible]
				Ephedra	5
				Indian ricegrass	5
393 Spring	Saline Bottom, 3-13" p.z. (30-23)	Favorable	1,600	Alkali sacaton	40
		Normal	[illegible]	Inland saltgrass	[illegible]
		Unfavorable	300	Big saltbush	10
				Big galleta	5
				Baltic rush	5
				Rush	5
				Fourwing saltbush	5
400 Tencee	Limy Upland, 3-6" p.z. (30-19)	Favorable	200	Creosotebush	40
		Normal	100	White bursage	20
		Unfavorable	50	Big galleta	10
				Fremont dalea	5
				Range ratany	5
				Indian ricegrass	5
415 Aztec	Limy Gyp Upland, 3-6" p.z. (30-31)	Favorable	100	Desertholly	45
		Normal	50	Fremont dalea	15
		Unfavorable	25	Seepweed	10
				Indian ricegrass	5
				California bearpoppy	5
417*: Aztec	Limy Gyp Upland, 3-6" p.z. (30-31)	Favorable	100	Desertholly	45
		Normal	50	Fremont dalea	15
		Unfavorable	25	Seepweed	10
				Indian ricegrass	5
				California bearpoppy	5
Rock outcrop.					
418*: Aztec	Limy Gyp Upland, 3-6" p.z. (30-31)	Favorable	100	Desertholly	45
		Normal	50	Fremont dalea	15
		Unfavorable	25	Seepweed	10
				Indian ricegrass	5
				California bearpoppy	[illegible]

See footnote at end of table.

TABLE 5.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Composition
			Lb/acre		Pct
418*:					
Nickel	Limy Upland, 3-6" p.z. (30-19)	Favorable	200	Creosotebush	40
		Normal	100	White bursage	20
		Unfavorable	50	Big galleta	10
				Ephedra	5
				Indian ricegrass	5
Knob Hill	Sandy Upland, 3-6" p.z. (30-37)	Favorable	300	Creosotebush	25
		Normal	150	Big galleta	20
		Unfavorable	50	White bursage	10
				Indian ricegrass	10
				Sand dropseed	5
				Bladdersage	5
419*:					
Aztec	Limy Gyp Upland, 3-6" p.z. (30-31)	Favorable	100	Desertholly	45
		Normal	50	Fremont dalea	15
		Unfavorable	25	Seepweed	10
				Indian ricegrass	5
				California bearpoppy	5
Bracken	Gyp Upland, 3-9" p.z. (30-26)	Favorable	100	Fremont dalea	30
		Normal	50	Desertholly	15
		Unfavorable	10	Creosotebush	10
				Sandpaper plant	10
				Saltbush	5
				Indian ricegrass	5
430 Knob Hill	Sandy Upland, 3-6" p.z. (30-37)	Favorable	300	Creosotebush	25
		Normal	150	Big galleta	20
		Unfavorable	50	White bursage	10
				Indian ricegrass	10
				Sand dropseed	5
				Bladdersage	5
440 Nickel	Limy Upland, 3-6" p.z. (30-19)	Favorable	200	Creosotebush	40
		Normal	100	White bursage	20
		Unfavorable	50	Big galleta	10
				Ephedra	5
				Indian ricegrass	5
450 Cave Variant	Limy Upland, 3-6" p.z. (30-19)	Favorable	200	Creosotebush	40
		Normal	100	White bursage	20
		Unfavorable	40	Big galleta	10
				Range ratany	5
				Indian ricegrass	5
				Bladdersage	5
481 Hobog	Limy Hill, 3-6" p.z. (30-17)	Favorable	125	Creosotebush	40
		Normal	75	White bursage	20
		Unfavorable	25	Big galleta	10
				Indian ricegrass	5
				Bush muhly	5
484 Hobog	Limy Hill, 3-6" p.z. (30-17)	Favorable	125	Creosotebush	40
		Normal	75	White bursage	20
		Unfavorable	25	Big galleta	10
				Indian ricegrass	5
				Bush muhly	5
500*					
Canutio	Limy Upland, 3-6" p.z. (30-19)	Favorable	200	Creosotebush	40
		Normal	100	White bursage	20
		Unfavorable	50	Big galleta	10
				Nevada ephedra	5

See footnote at end of table.

TABLE 5.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Composition
			Lb/acre		Pct
500*:					
Akela	Limy Hill, 3-6" p.z. (30-17)	Favorable	125	Creosotebush	35
		Normal	75	White bursage	20
		Unfavorable	25	Big galleta	10
				Ephedra	5
				Bush muhly	5
				Indian ricegrass	5
				Range ratany	5
501	Limy Upland, 3-6" p.z. (30-19)	Favorable	200	Creosotebush	35
Canutio		Normal	100	White bursage	10
		Unfavorable	50	Big galleta	5
				Shadscale	5
				Range ratany	5
				Bladdersage	5
502*:					
Canutio	Limy Upland, 3-6" p.z. (30-19)	Favorable	200	Creosotebush	35
		Normal	100	White bursage	10
		Unfavorable	50	Big galleta	5
				Shadscale	5
				Range ratany	5
				Bladdersage	5
Cave	Limy Upland, 3-6" p.z. (30-19)	Favorable	200	Creosotebush	40
		Normal	100	White bursage	20
		Unfavorable	50	Big galleta	10
				Indian ricegrass	5
505*:					
Canutio	Limy Upland, 3-6" p.z. (30-19)	Favorable	200	Creosotebush	40
		Normal	100	White bursage	20
		Unfavorable	50	Big galleta	10
				Nevada ephedra	5
Akela	Limy Hill, 3-6" p.z. (30-17)	Favorable	125	Creosotebush	35
		Normal	75	White bursage	20
		Unfavorable	25	Big galleta	10
				Ephedra	5
				Indian ricegrass	5
				Bush muhly	5
				Range ratany	5
510*:					
Akela	Limy Hill, 3-6" p.z. (30-17)	Favorable	125	Creosotebush	35
		Normal	75	White bursage	20
		Unfavorable	25	Big galleta	10
				Ephedra	5
				Indian ricegrass	5
				Bush muhly	5
				Range ratany	5
Rock outcrop.					
540	Limy Upland, 3-6" p.z. (30-19)	Favorable	200	Creosotebush	40
Weiser		Normal	100	White bursage	20
		Unfavorable	50	Big galleta	10
				Indian ricegrass	5
				Bladdersage	5
542*:					
Weiser	Limy Upland, 3-6" p.z. (30-19)	Favorable	20	Creosotebush	40
		Normal	100	White bursage	20
		Unfavorable	50	Big galleta	10
				Indian ricegrass	5
				Bladdersage	5

See footnote at end of table.

TABLE 5.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production		Characteristic vegetation	Composition
		Kind of year	Dry weight		
			Lb/acre		Pct
542*:					
Aztec	Limy Gyp Upland, 3-6" p.z. (30-31)	Favorable	100	Desertholly	45
		Normal	50	Fremont dalea	15
		Unfavorable	25	Seepweed	10
				Indian ricegrass	5
				California bearpoppy	5
545*					
Weiser	Limy Upland, 3-6" p.z. (30-19)	Favorable	200	Creosotebush	40
		Normal	100	White bursage	20
		Unfavorable	50	Big galleta	10
				Indian ricegrass	5
				Bladdersage	5
Goodsprings	Limy Upland, 3-6" p.z. (30-19)	Favorable	200	Creosotebush	[illegible]
		Normal	100	White bursage	20
		Unfavorable	50	Big galleta	10
				Ephedra	5
				Indian ricegrass	5

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 6.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS

[The symbol < means less than; > means more than. Absence of an entry indicates that trees generally do not grow to the given height on that soil]

Soil name and map symbol	Trees having predicted 20-year average heights, in feet, of--				
	<8	8-15	16-25	26-35	>35
105*: McCullough	Pyracantha, sierra currant.	Oleander, mesquite	Velvet ash, Russian mulberry.	Arizona cypress, allepo pine.	Bluegum eucalyptus, Lombardy poplar, robusta cottonwood.
Jean	Big saltbush, pyracantha.	Desertwillow, oleander.	Velvet ash, Russian mulberry.	Allepo pine, Italian cypress.	Athel, bluegum eucalyptus, robusta cottonwood.
Bluepoint	Big saltbush, pyracantha.	Oleander, bladdersenna.	Velvet ash, Russian mulberry.	Allepo pine, Italian cypress.	Athel, bluegum eucalyptus, robusta cottonwood.
107 Arizo	Big saltbush, cotoneaster.	Oleander, tamarisk	Thuja, Russian mulberry.	Arizona cypress, narrowleaf cottonwood.	Athel, robusta eucalyptus, robosta cottonwood.
112 Arizo	Big saltbush, cotoneaster.	Oleander, tamarisk	Thuja, Russian mulberry.	Narrowleaf cottonwood, Arizona cypress.	Athel, robusta eucalyptus.
113 Arizo	Big saltbush, pyracantha.	Desertwillow, mesquite.	Russian mulberry, velvet ash.	Allepo pine, narrowleaf cottonwood.	Robusta cottonwood, Athel, bluegum eucalyptus.
117 Arizo	Big saltbush, pyracantha.	Bladdersenna, mesquite.	Russian mulberry, velvet ash.	Allepo pine, Italian cypress.	Athel, bluegum eucalyptus, robusta cottonwood.
120 Bluepoint	Fourwing saltbush, common juniper.	Silver buffaloberry, desertwillow.	Rocky Mountain juniper, Russian-olive.	Narrowleaf cottonwood, Siberian elm.	Bluegum eucalyptus, Athel.
127, 128, 129 Bluepoint	Big saltbush, pyracantha.	Oleander, bladdersenna.	Velvet ash, Russian mulberry.	Allepo pine, Italian cypress.	Athel, bluegum eucalyptus, robusta cottonwood.
130*: Bracken	Big saltbush, pyracantha.	Desertwillow, Tatarian honeysuckle.	Russian mulberry, silver buffaloberry.	Siberian elm, narrowleaf cottonwood.	Athel, bluegum eucalyptus, robusta cottonwood.
Destazo	Cotoneaster, pyracantha.	Mexican cliffrose, desertwillow, mesquite, oleander.	Russian-olive, singleleaf pinyon.	Allepo pine, honeylocust.	Athel, [illegible] cottonwood.
132 Bracken	Big saltbush, pyracantha.	Desertwillow, Tatarian honeysuckle.	Russian mulberry, silver buffaloberry.	Siberian elm, narrowleaf cottonwood.	Athel, bluegum eucalyptus, robusta cottonwood.

See footnote at end of table.

TABLE 6.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average heights, in feet, of--				
	<8	8-15	16-25	26-35	>35
133*:					
[illegible]	[illegible], [illegible].	Desertwillow, Tatarian honeysuckle.	Russian mulberry, silver buffaloberry.	Siberian elm, narrowleaf cottonwood.	Athel, bluegum eucalyptus, robusta cottonwood.
Rock outcrop.					
[illegible]	[illegible], pyracantha.	Desertwillow, Tatarian honeysuckle.	Russian mulberry, silver buffaloberry.	Siberian elm, narrowleaf cottonwood.	Athel, bluegum eucalyptus, robusta cottonwood.
[illegible]	[illegible], common juniper.	Desertwillow, oleander.	Russian mulberry, Russian-olive.	Siberian elm, allepo pine.	Athel, robusta eucalyptus.
[illegible]	[illegible], pyracantha.	Tatarian honeysuckle, coyote willow.	Common chokecherry, silver buffaloberry.	Golden willow, narrowleaf cottonwood.	Blackbutt eucalyptus, Lombardy poplar, robusta cottonwood.
[illegible]	[illegible], [illegible].	Tatarian honeysuckle, coyote willow.	Common chokecherry, silver buffaloberry.	Golden willow, narrowleaf cottonwood.	Blackbutt eucalyptus, cottonwood, robusta cottonwood.
[illegible]	Cotoneaster, [illegible].	Mexican cliffrose, desertwillow, mesquite, oleander.	Russian olive, singleleaf pinyon.	Aleppo pine, honeylocust.	Athel, Siouxland cottonwood.
[illegible]	[illegible], pyracantha.	Mexican cliffrose, desertwillow.	Russian-olive, Utah juniper.	Japanese black pine, honeylocust.	Bluegum eucalyptus, Athel.
[illegible]	[illegible], [illegible].	Coyote willow, American plum.	Common chokecherry, silver buffaloberry.	Golden willow, narrowleaf cottonwood.	Blackbutt eucalyptus, Fremont cottonwood, Lombardy poplar.
[illegible]	Cotoneaster, pyracantha.	Mexican cliffrose, desertwillow.	Russian-olive, Utah juniper.	Japanese black pine, honeylocust.	Bluegum eucalyptus, Athel.
Pittman	Forsythia, [illegible].	Coyote willow, American plum.	Common chokecherry, silver buffaloberry.	Golden willow, narrowleaf cottonwood.	Blackbutt eucalyptus, Fremont cottonwood, Lombardy poplar.
[illegible]	[illegible], [illegible].	Oleander, tamarisk	Thuja, Russian mulberry.	Narrowleaf cottonwood, Arizona cypress.	Athel, robusta eucalyptus.

See footnote at end of table.

TABLE 6.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average heights, in feet, of--				
	<8	8-15	16-25	26-35	>35
183, 184, 187 ---- Caliza	Cotoneaster, pyracantha	Mexican cliffrose, desertwillow.	Russian-olive, Utah juniper.	Japanese black pine, honeylocust.	Bluegum eucalyptus, Athel.
190, 191---------- Dalian	Big saltbush, pyracantha.	Desertwillow, oleander.	Velvet ash, Russian mulberry.	Allepo pine, Italian cypress.	Athel, bluegum eucalyptus, robusta cottonwood.
192*: Dalian----------	Big saltbush, pyracantha.	Desertwillow, oleander.	Velvet ash, Russian mulberry.	Allepo pine, Italian cypress.	Athel, bluegum eucalyptus, robusta cottonwood.
McCullough--------	Cotoneaster, pyracantha, forsythia.	Desertwillow, oleander, Siberian peashrub.	Utah juniper, Russian-olive.	Allepo pine, Japanese black pine.	Athel, honeylocust.
201-------------- Glencarb	Pyracantha, common juniper.	Oleander, desertwillow.	Russian-olive, alligator juniper.	Arizona cypress, Allepo pine.	Bluegum eucalyptus, Fremont cottonwood.
206, 222---------- Glencarb	Common juniper, pyracantha.	Lilac, coyote willow.	Russian-olive, velvet ash.	Allepo pine, California sycamore.	Bluegum eucalyptus, Lombardy poplar.
236-------------- Glencarb	Common juniper, pyracantha.	Oleander, lilac.	Russian-olive, velvet ash.	Allepo pine, California sycamore.	Bluegum eucalyptus, Lombardy poplar.
237-------------- Glencarb	Pyracantha, big saltbush.	Oleander, lilac----	Velvet ash, Russian-olive.	Allepo pine, Arizona cypress, California sycamore.	Lombardy poplar, bluegum eucalyptus.
240-------------- Goodsprings	Big saltbush, pyracantha.	Tatarian honeysuckle, coyote willow.	Common chokecherry, silver buffaloberry.	Golden willow, narrowleaf cottonwood.	Blackbutt eucalyptus, Lombardy poplar, robusta cottonwood.
252, 255---------- Grapevine	Big saltbush, pyracantha.	Oleander, desertwillow.	Velvet ash, Russian mulberry, Russian-olive.	Arizona cypress, allepo pine.	Athel, bluegum eucalyptus, robusta cottonwood.
260-------------- Jean	Big saltbush, pyracantha.	Desertwillow, oleander.	Velvet ash, Russian mulberry.	Allepo pine, Italian cypress.	Athel, bluegum eucalyptus, robusta cottonwood.
262*: Jean------------	Big saltbush, pyracantha.	Desertwillow, oleander.	Velvet ash, Russian mulberry.	Allepo pine, Italian cypress.	Athel, bluegum eucalyptus, robusta cottonwood.
Jean------------	Big saltbush, pyracantha.	Desertwillow, oleander.	Velvet ash, Russian mulberry.	Allepo pine, Italian cypress.	Athel, bluegum eucalyptus, robusta cottonwood.

See footnote at end of table.

TABLE 6.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average heights, in feet, of--				
	<8	8-15	16-25	26-35	>35
262*:					
[illegible]springs	Big saltbush, pyracantha.	Tatarian honeysuckle, coyote willow.	Common chokecherry, silver buffaloberry.	Golden willow, narrowleaf cottonwood.	Blackbutt eucalyptus, Lombardy poplar, robusta cottonwood.
264*:					
[illegible]	Big saltbush, pyracantha.	Desertwillow, oleander.	Velvet ash, Russian mulberry.	Allepo pine, Italian cypress.	Athel, bluegum eucalyptus, robusta cottonwood.
[illegible]	Big saltbush, pyracantha.	Desertwillow, oleander.	Velvet ash, Russian mulberry.	Allepo pine, Italian cypress.	Athel, bluegum eucalyptus, robusta cottonwood.
[illegible] Jean	Big saltbush, pyracantha.	Desertwillow, oleander.	Velvet ash, Russian mulberry.	Allepo pine, Italian cypress.	Athel, bluegum eucalyptus, robusta cottonwood.
27[illegible] Land	Big saltbush, fourwing saltbush.	Desertwillow.	Silver buffaloberry, Russian mulberry.	Siberian elm.	Athel, robusta eucalyptus.
[illegible] Land	Big saltbush, fourwing saltbush.	Arroyo willow, coyote willow.	Russian mulberry, Russian-olive.	Golden willow, narrowleaf cottonwood.	Athel, cottonwood, robusta eucalyptus.
28[illegible] Land	Big saltbush, fourwing saltbush.	Desertwillow.	Silver buffaloberry, Russian mulberry.	Siberian elm.	Athel, robusta eucalyptus.
30[illegible], 30[illegible] Las Vegas	Forsythia, pyracantha.	American plum, arroyo willow.	Common chokecherry, Russian-olive.	Narrowleaf cottonwood, golden willow.	Blackbutt eucalyptus, Lombardy poplar, Fremont cottonwood.
30[illegible]*:					
Las Vegas	Forsythia, pyracantha.	American plum, arroyo willow.	Common chokecherry, Russian-olive.	Narrowleaf cottonwood, golden willow.	Blackbutt eucalyptus, Lombardy poplar, Fremont cottonwood.
McCarran	Big saltbush, fourwing saltbush.	Desertwillow, mesquite.	Russian mulberry, Russian-olive.	Siberian elm, narrowleaf cottonwood.	Athel, robusta eucalyptus, cottonwood.
Grapevine	Big saltbush, pyracantha.	Oleander, desertwillow.	Velvet ash, Russian mulberry, Russian-olive.	Arizona cypress, allepo pine.	Athel, bluegum eucalyptus, robusta cottonwood.
305*:					
Las Vegas	Forsythia, pyracantha.	American plum, arroyo willow.	Common chokecherry, Russian-olive.	Narrowleaf cottonwood, golden willow.	Blackbutt eucalyptus, Lombardy poplar, Fremont cottonwood.
Destazo	Big saltbush, pyracantha.	Oleander, desertwillow.	Chinese elm, velvet ash.	Arizona cypress, black locust, allepo pine.	Athel, bluegum eucalyptus, Lombardy poplar.

See footnote at end of table.

TABLE 6.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
307*:					
Las Vegas	Forsythia, pyracantha.	American plum, arroyo willow.	Common chokecherry, Russian-olive.	Narrowleaf cottonwood, golden willow.	Blackbutt eucalyptus, Lombardy poplar, Fremont cottonwood.
[illegible]	Big saltbush, common juniper.	Desertwillow, mesquite.	Velvet ash, common chokecherry.	Allepo pine, Siberian elm.	Athel, robusta eucalyptus.
[illegible] McCarran	Big saltbush, fourwing saltbush.	Desertwillow, mesquite.	Russian mulberry, Russian-olive.	Siberian elm, narrowleaf cottonwood.	Athel, robusta eucalyptus, cottonwood.
326 [illegible]	Fourwing saltbush, big saltbush.	Desertwillow, mesquite.	Russian-olive, Russian mulberry.	Siberian elm, narrowleaf cottonwood.	Athel, robusta eucalyptus, cottonwood.
341 Paradise	Big saltbush, fourwing saltbush.	Desertwillow, arroyo willow.	Russian mulberry, Russian-olive.	Siberian elm, golden willow.	Athel, robusta eucalyptus.
360*:					
Rock outcrop.					
St. Thomas	Forsythia, pyracantha.	Mexican cliffrose, Amur honeysuckle	Common chokecherry, Rocky Mountain juniper.	Narrowleaf cottonwood, California sycamore.	Blackbutt eucalyptus, Fremont cottonwood.
380 Skyhaven	Big saltbush, common juniper.	Desertwillow, mesquite.	Velvet ash, common chokecherry.	Allepo pine, Siberian elm.	Athel, robusta eucalyptus.
[illegible]	Big saltbush, fourwing saltbush.	Desertwillow, mesquite.	Russian-olive, silver buffaloberry.	Siberian elm, narrowleaf cottonwood.	Cottonwood, bluegum eucalyptus, robusta cottonwood.
[illegible]	Forsythia, big saltbush.	Tatarian honeysuckle, arroyo willow.	Common chokecherry, silver buffaloberry.	Golden willow, narrowleaf cottonwood.	Blackbutt eucalyptus, Lombardy poplar, robusta cottonwood.
[illegible]	Big saltbush, common juniper.	Oleander, oneseed juniper.	Alligator juniper, Russian mulberry.	Siberian elm, allepo pine.	Robusta eucalyptus, Athel.
[illegible]					
[illegible]	Big saltbush, common juniper.	Oleander, oneseed juniper.	Alligator juniper, Russian mulberry.	Siberian elm, allepo pine.	Robusta eucalyptus, Athel.
[illegible]					
[illegible]					
[illegible]	Big saltbush, common juniper.	Oleander, oneseed juniper.	Alligator juniper, Russian mulberry.	Siberian elm, allepo pine.	Robusta eucalyptus, Athel.
Nickel	Big saltbush, pyracantha.	[illegible], desertwillow.	Velvet ash, Russian mulberry.	Allepo pine, Italian cypress.	Athel, bluegum eucalyptus, robusta cottonwood.

See footnote at end of table.

TABLE 6.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average heights, in feet, of--				
	<8	8-15	16-25	26-35	>35
418*:					
Knob Hill	Big saltbush, cotoneaster.	Oleander, mesquite	Russian-olive, velvet ash.	Arizona cypress, allepo pine, Italian cypress.	Athel, bluegum eucalyptus, robusta cottonwood.
419*:					
Aztec	Big saltbush, common juniper.	Oleander, oneseed juniper.	Alligator juniper, Russian mulberry.	Siberian elm, allepo pine.	Robusta eucalyptus, Athel.
Bracken	Big saltbush, pyracantha.	Desertwillow, Tatarian honeysuckle.	Russian mulberry, silver buffaloberry.	Siberian elm, narrowleaf cottonwood.	Athel, bluegum eucalyptus, robusta cottonwood.
430 Knob Hill	Big saltbush, cotoneaster.	Oleander, mesquite	Russian-olive, velvet ash.	Arizona cypress, allepo pine, Italian cypress.	Athel, bluegum eucalyptus, robusta cottonwood.
440 Nickel	Big saltbush, pyracantha.	Oleander, desertwillow.	Velvet ash, Russian mulberry, Italian cypress.	Allepo pine, Italian cypress.	Athel, bluegum eucalyptus, robusta cottonwood.
453 Cave Variant	Forsythia, pyracantha.	Mexican cliffrose, American plum.	Common chokecherry, Russian-olive.	Golden willow, narrowleaf cottonwood.	Bluegum eucalyptus, cottonwood.
481, 484 [illegible]	Forsythia, pyracantha.	Mexican cliffrose, American plum.	Common chokecherry, Russian-olive.	Golden willow, narrowleaf cottonwood.	Robusta eucalyptus, Fremont cottonwood.
500*:					
Canutio	Big saltbush, pyracantha.	Desertwillow, mesquite	Russian mulberry, velvet ash	Allepo pine, narrowleaf cottonwood.	Athel, bluegum eucalyptus, robusta cottonwood.
Akela	Big saltbush, forsythia.	Mexican cliffrose, coyote willow.	Common chokecherry, Russian mulberry.	Golden willow, narrowleaf cottonwood.	Blackbutt eucalyptus, Fremont cottonwood.
501 Canutio	Big saltbush, pyracantha.	Desertwillow, mesquite	Russian mulberry, velvet ash	Allepo pine, narrowleaf cottonwood.	Athel, bluegum eucalyptus, robusta cottonwood.
502*					
Canutio	Big saltbush, pyracantha.	Desertwillow, mesquite.	Russian mulberry, velvet ash.	Allepo pine, narrowleaf cottonwood.	Athel, bluegum eucalyptus, robusta cottonwood.
Cave	Big saltbush, pyracantha.	Tatarian honeysuckle, coyote willow.	Common chokecherry, silver buffaloberry.	Golden willow, narrowleaf cottonwood.	Blackbutt eucalyptus, cottonwood, robusta cottonwood.

See footnote at end of table.

TABLE 6.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average heights, in feet, of--				
	<8	8-15	16-25	26-35	>35
505*: Caritio	Big saltbush, pyracantha.	Desertwillow, mesquite.	Russian mulberry, velvet ash.	Allepo pine, narrowleaf cottonwood.	Athel, bluegum eucalyptus, robusta cottonwood.
Akela	Big Saltbush, forsythia.	Mexican cliffrose, coyote willow.	Common chokecherry, Russian mulberry.	Golden willow, narrowleaf, cottonwood.	Blackbutt eucalyptus, Fremont cottonwood.
510* Akela	Big saltbush, forsythia.	Mexican cliffrose, coyote willow.	Common chokecherry, Russian mulberry.	Golden willow, narrowleaf cottonwood.	Blackbutt eucalyptus, Fremont cottonwood.
Rock outcrop.					
540* Weiser	Big saltbush, pyracantha.	Oleander, desertwillow.	Velvet ash, Russian mulberry.	Allepo pine, Italian cypress.	Athel, bluegum eucalyptus, robusta cottonwood.
542*: Weiser	Big saltbush, pyracantha.	Oleander, desertwillow.	Velvet ash, Russian mulberry.	Allepo pine, Italian cypress.	Athel, bluegum eucalyptus, robusta cottonwood.
Aztec	Big saltbush, common juniper.	Oleander, oneseed juniper.	Alligator juniper, Russian mulberry.	Siberian elm, allepo pine.	Robusta eucalyptus, Athel.
545* Weiser	Big saltbush, pyracantha.	Oleander, desertwillow.	Velvet ash, Russian mulberry.	Allepo pine, Italian cypress.	Athel, bluegum eucalyptus, robusta cottonwood.
Goodsprings	Big saltbush, pyracantha.	Tatarian honeysuckle, coyote willow.	Common chokecherry, silver buffaloberry.	Golden willow, narrowleaf cottonwood.	Blackbutt eucalyptus, Lombardy poplar, robusta cottonwood.
600*. Slickens					
605*. Dumps					
610*. Pits					
615*. Urban land					
630*. Badlands					
635*, 640*. Rock outcrop					
645*. Pits					

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 7.--LANDSCAPE PLANTINGS

Common name	Horticultural group						Management and plant characteristics
	1	2	3	4	5	6	
BULBS							
Rooting depth is approximately 24 inches but can vary according to the effective rooting depth of the soil.							
Allium	x	x	x			x	Partly shady to sunny sites; flower stalks 6 inches to 5 feet; about 500 species; wide variety of flower colors, blooms late in spring through summer, plant in fall.
Crocus	x	x	x			x	Partly shady to sunny sites, foliage is grasslike; flowers 3 to 6 inches long; blooms early in spring or August through November.
Dahlia	x	x	x			x	Partly shady to sunny sites, 1½ inches to 6 feet high; dark green foliage, numerous flower types and colors; bush or bedding plant.
Grapehyacinth	x	x	x			x	Partly shady to sunny sites, blue or white flowers early in spring, plant 2 inches deep in fall.
Violet-scented iris	x	x	x			x	Sunny sites, blue-green foliage after bloom, violet-purple flowers, stems 6 to 8 inches high, blooms March and April; plant 3 to 4 inches deep
DECIDUOUS HEDGES AND SCREENS							
Rooting depth is approximately 48 inches but can vary according to the effective rooting depth of the soil.							
Alder buckthorn	x	x					Partly shady to sunny sites; 15 to 18 feet high, 6 to 10 feet wide; glossy dark green foliage.
Barberry	x	x	x	x		x	Partly shady to average sunny sites; 4 to 6 feet high; average 4 to 6 feet wide, green foliage, yellow flowers in spring.
Beautyberry	x	x					Sunny sites; 6 to 10 feet high; green peachlike foliage, turns pink to purple before falling, lilac flowers.
Big saltbush	x	x	x	x	x	x	Sunny sites; 6 to 10 feet high, 6 to 10 feet wide; silver-gray foliage.
Dwarf purplewillow	x	x	x	x		x	Sunny sites; 1 to 3 feet high; 1 to 3 feet wide if pruned; blue-gray foliage, grows well from cuttings.
European cranberry	x	x	x	x		x	Sunny sites; 10 to 20 feet high; prune as desired, dark green foliage, red in fall; white flower clusters in May; aphids commonly a problem.
Father Hugo's rose	x	x					Sunny sites; 8 feet high; prune as desired, deep green foliage; bright yellow flowers in May and June.
Flowering quince	x		x			x	Sunny sites; 2 to 10 feet high, width varies; shiny green foliage, flower color varies, susceptible to chlorosis.

TABLE 7. LANDSCAPE PLANTINGS--Continued

Common name	Horticultural group						Management and plant characteristics
	1	2	3	4	5	6	
DECIDUOUS HEDGES AND SCREENS--Continued							
Rooting depth is approximately 48 inches but can vary according to the effective rooting depth of the soil.							
Hawthorn	x	x					Sunny sites; 30 feet high; 8 feet wide; green foliage; white flowers in spring; aphids and fireblight common problems.
Ocotillo	x	x	x				Sunny sites, 6 to 20 feet high; 5 to 15 feet wide, green foliage, red flowers from April to June; sensitive to overwatering.
Ramanas rose	x	x	x			x	Sunny sites, 3 to 8 feet tall; prune as needed, glossy green foliage; varied flower color; fragrant.
Russian-olive	x	x	x	x	x	x	Sunny sites, 2[illegible] feet high, [illegible] to 12 feet wide, silvery gray foliage; greenish yellow flowers early in summer; small berrylike fruit.
Siberian peashrub	x	x	x	x		x	Sunny sites, 20 feet high; 15 feet wide, bright green foliage; yellow flowers in spring.
Sweetbriar rose	x	x					Sunny sites; 8 to 12 feet high, 3 to 4 feet wide, pink flowers late in spring; susceptible to chlorosis.
Western sandcherry	x		x		x		Sunny sites; 3 to 6 feet high; green foliage, white flowers in spring, peach tree borers a common problem.
Weigela	x	x					Partly shady to sunny sites; average 6 feet high, prune as desired; green foliage; flower color varies.
EVERGREEN HEDGES AND SCREENS							
Rooting depth is approximately 48 inches but can vary according to the effective rooting depth of the soil.							
Abelia	x	x					Sunny sites; 4 to 8 feet high; 3 to 6 feet wide, evergreen foliage; white flowers from June to October.
Black Sally eucalyptus	x	x	x				Sunny sites; 20 to 50 feet high; green foliage, smooth gray bark changes to olive green; white to cream flowers from October to April.
Bushy yate eucalyptus	x	x	x			x	Sunny sites; 20 to 30 feet high; light green foliage, apple green flowers; fast growing.
Common kochia	x	x	x	x	x	x	Sunny sites, 3 feet high, light green foliage, summer annual, good for temporary hedge.
Creeping mahonia	x	x	x				Partly shady to sunny sites; 3 feet tall, spreading habit; bluish green foliage; yellow flowers from April to June; blue berries.
Creosotebush	x	x	x	x		x	Sunny sites; 5 to 11 feet high, 4 to 15 feet wide, gray-green foliage; yellow flowers in April and May; sensitive to overwatering.

TABLE 7.--LANDSCAPE PLANTINGS--Continued

Common name	Horticultural group						Management and plant characteristics
	1	2	3	4	5	6	
EVERGREEN HEDGES AND SCREENS--Continued							
[Rooting depth is approximately 48 inches but can vary according to the effective rooting depth of the soil]							
Dwarf bluegum eucalyptus	x	x	x				Sunny sites; 60 to 70 feet high; dark green foliage; creamy white to yellow flowers in winter and spring; messy; good windbreak tree.
Euonymus	x	x	x			x	Sunny sites, 9 feet high; spreading shrub; light green foliage; snowy pinkish fruit that has red seeds.
Evergreen euonymus	x	x	x	x			Sunny sites; 8 to 10 feet high; 6 feet wide; deep green foliage; scale, thrips, and spider mites are common problems; susceptible to mildew.
Fraser's photinia	x	x	x	x			Sunny sites; 10 feet high; 10 to 12 feet wide; green foliage; clusters of white flowers early in spring; susceptible to chlorosis.
Heavenly bamboo	x	x	x				Partly shady sites; 3 to 5 feet high; 1 to 2 feet wide; bronze foliage in fall and winter; strongly chlorotic; moderately susceptible to nematodes.
Hollyleaf redberry	x	x	x			x	Sunny sites; 3 to 15 feet high; green foliage, bright red oval fruit.
Incense-cedar	x	x					Sunny sites, 75 to 90 feet high; green foliage, reddish brown trunk.
Italian buckthorn	x	x	x				Partly shady to sunny sites; 12 to 20 feet high; 12 to 20 feet wide; shiny green foliage; greenish yellow flowers in April.
Juniper	x	x	x	x		x	Sunny sites; 4 to 6 feet high; 3 to 5 feet wide; green foliage; vase form; nitrogen and salt sensitive; mites a common problem.
Laurustinus	x	x	x	x	x	x	Shady sites; 6 to 12 feet high; 3 to 6 feet wide, dark green foliage; white flowers late in fall to spring; moderately susceptible to chlorosis.
Magellan barberry	x	x				x	Partly shady to sunny sites, 6 feet high, 6 feet wide; green foliage; orange-yellow flowers, dark purple berries.
Narrowleaf gimlet eucalyptus	x	x	x	x			Sunny sites, 6 to 20 feet high, green foliage, smooth red bark, cream and gold flowers in summer; tolerates poor drainage.
Oleander	x	x	x	x	x	x	Sunny sites; 6 to 15 feet high; 8 to 15 feet wide; green or variegated foliage, multicolored flowers from May to September; susceptible to root rot; highly competitive with nearby plants, can invade sewer lines.
Oregon-grape	x	x	x				Shady sites, 2 to 6 feet high, 6 feet wide, green foliage, yellow flowers from March to May; edible blue-black fruit, susceptible to chlorosis.

TABLE 7.--LANDSCAPE PLANTINGS--Continued

Common name	Horticultural group 1	2	3	4	5	6	Management and plant characteristics
							EVERGREEN HEDGES AND SCREENS--Continued
							[Rooting depth is approximately 48 inches but can vary according to the effective rooting depth of the soil]
Oriental arborvitae	x	x					Partly shady sites; 20 to 25 feet high; prune to shape; green foliage; spider mites a common problem.
Pfitzer juniper	x	x	x	x		x	Sunny sites; 4 to 6 feet high; 8 to 15 feet wide, gray-green foliage, upright, spreading form, nitrogen and salt sensitive, mites a common problem.
Pittosporum	x	x	x				Shady sites, 5 to 8 feet high; 4 to 8 feet wide, green or variegated foliage; white flowers early in spring; somewhat susceptible to mildew, somewhat tolerant of frost.
Port-Orford-cedar	x	x					Sunny sites; 60 feet high; 50 feet wide, blue-green foliage.
Rosemary	x	x	x				Sunny sites; 2 to 6 feet high; 2 to 4 feet wide, gray-green foliage; light lavender blue flowers in winter and spring; susceptible to phytophthora and Texas root rot.
Roundleaf moort eucalyptus	x	x	x				Sunny sites; 20 to 30 feet high; space 12 feet apart for screening, dull green foliage; small white flowers in summer.
Saltbush	x	x	x	x		x	Sunny sites; 1 to 6 feet high; 1 to 8 feet wide, gray-green to silvery foliage; evergreen or deciduous; gray flowers in April and May, sensitive to overwatering.
Smooth Arizona cypress	x	x	x	x		x	Sunny sites; 40 feet high; 20 feet wide, green, blue-green, or gray foliage.
Texas ranger	x	x	x	x		x	Sunny sites, 4 to 5 feet high, 2 to 4 feet wide; gray to silver, lavender flowers from May to August, somewhat susceptible to root rot.
Toyon	x	x	x	x			Partly shady to sunny sites; 5 to 15 feet high; 5 to 15 feet wide; dark green glossy foliage, clusters of white flowers in June and July; bright or pale red fruit from November to January.
Winter creeper	x	x				x	Shady or sunny sites; vine or shrub; 20 feet wide if allowed to spread; dark green foliage.
							DECIDUOUS SHADE TREES
							[Rooting depth is from 4 to 10 feet but can vary according to the effective rooting depth of the soil]
Blackgum	x		x		x		Sunny sites; 30 to 50 feet high, 15 to 25 feet wide; dark green foliage, hot coppery red in fall, tolerates poor drainage.

TABLE 7.--LANDSCAPE PLANTINGS--Continued

Common name	Horticultural group						Management and plant characteristics
	1	2	3	4	5	6	
DECIDUOUS SHADE TREES--Continued							
[Rooting depth is from 4 [illegible] feet but can vary according to the effective rooting depth of the soil]							
Blue oak	x		x		x		Sunny sites; up to 50 feet high; bluish green foliage, yellow, orange, and pink in fall.
California redbud	x		x	x			Partly shady sites; 15 feet high; 10 to 18 feet wide, blue-green foliage in summer; magenta flowers in spring; salt sensitive.
Chaste tree	x	x					Sunny sites; 15 feet high; 15 to 20 feet wide, gray-green foliage; purple flowers from July to November.
Chinese pistache	x		x		x		Sunny sites, 40 to 50 feet high; 30 to 45 feet wide; green foliage, bronze in fall, somewhat susceptible to root rot.
Crabapple	x		x				Sunny sites; 6 to 30 feet high, 10 to 20 feet wide; deep green or purple foliage; pink flowers in spring.
Crimean linden	x		x				Sunny sites; 25 to 35 feet high; 25 to 35 feet wide; green foliage; yellowish white flowers in July; susceptible to aphids and sooty mildew.
Desertwillow	x	x	x		x	x	Sunny sites; 15 to 20 feet high; 15 to 25 feet wide; light green foliage, purple flowers from spring to fall; susceptible to root rot.
European mountain-ash	x		x				Partly shady to sunny sites; 20 to 30 feet high, 15 to 20 feet wide, green foliage, yellow, orange or red in fall; white flowers late in spring susceptible to cankers and fire blight.
Hawthorn	x		x		x		Sunny sites; 15 to 25 feet high; 15 to 20 feet wide; dark green foliage; white flowers in spring, susceptible to aphids and fire blight.
Honeylocust	x		x		x		Sunny sites; 40 to 50 feet high; 30 to 45 feet wide, green foliage, yellow in fall; somewhat susceptible to nematodes and root rot.
Japanese pagoda tree	x		x		x		20 to 40 feet high; 20 to 40 feet wide, dark green foliage; yellowish white flowers in summer.
Japanese snowdrop tree	x		x				Partly shady to sunny; up to 30 feet high, 30 feet wide; dark green foliage; white flowers in spring.
Jerusalem-thorn	x		x				Sunny sites; 15 to 30 feet high; 15 to 30 feet wide; sparse foliage; very tolerant of drought.
Littleleaf linden	x		x				Sunny sites; 30 to 50 feet high; 15 to 30 feet wide; green foliage, yellowish white flowers in July; susceptible to aphids and sooty mildew.
Mesquite	x		x		x		30 feet high, 40 feet wide, bright green foliage, small greenish yellow flowers.

TABLE 7.--LANDSCAPE PLANTINGS--Continued

Common name	Horticultural group						Management and plant characteristics
	1	2	3	4	5	6	
DECIDUOUS SHADE TREES--Continued [Rooting depth is from 4 to 10 feet but can vary according to the effective rooting depth of the soil]							
Moraine ash	x		x		x		Sunny sites; 40 feet high; 20 to 30 feet wide, dull green foliage, bright yellow in fall.
Mulberry	x		x		x		Sunny sites; 40 to 50 feet high; 30 to 45 feet wide; dark green foliage, yellow in fall; susceptible to root rot, nematodes, and sooty canker.
Pin oak	x		x				Sunny sites, 50 to 80 feet high, 40 feet wide, glossy dark green foliage, susceptible to chlorosis; needs good drainage.
Pomegranate	x		x		x		Sunny sites, 2 to 4 feet high; 3 to 6 feet wide, foliage dark green, yellow in fall, orange flowers from June to August; moderately susceptible to chlorosis.
Scarlet oak	x		x		x		Sunny sites, 60 to 80 feet high, bright green foliage; needs deep soil.
Serviceberry	x		x		x		Sunny sites, 30 to 35 feet high, young foliage purplish, deep green in spring, yellow and red in fall; white flowers in spring; edible dark blue fruit early in summer.
Silktree	x		x	x	x		Sunny sites; 12 to 15 feet high; 15 to 25 feet wide; light green foliage; pink flowers in summer, susceptible to leaf hoppers and sooty canker.
Willow oak	x		x				Sunny sites, 50 to 90 feet high; 40 feet wide, green foliage, susceptible to chlorosis.
EVERGREEN TREES [Rooting depth is from 4 to 10 feet but can vary according to the effective rooting depth of the soil]							
Aleppo pine	x	x	x	x			Sunny sites, 30 to 60 feet high; light green foliage, oblong cones, reddish to yellowish brown.
Austrian black pine	x	x	x	x		x	Sunny sites, 40 feet high; very dark green foliage; oval brown cones.
Bronze loquat	x	x	x				Partly shady to sunny sites; shrub, if pruned, or tree; green foliage; creamy white flowers in in spring.
California-laurel	x	x					Shady to sunny sites; 20 to 25 feet high; 20 to 25 feet wide; yellow-green foliage.
Carolina cherry laurel	x	x	x				Sunny sites, 35 to 40 feet high; prune to shape; glossy green foliage; creamy white flowers from February to April; susceptible to chlorosis.

TABLE 7.--LANDSCAPE PLANTINGS--Continued

Common name	Horticultural group						Management and plant characteristics
	1	2	3	4	5	6	
EVERGREEN TREES--Continued [Rooting depth is from 4 to 10 feet but can vary according to the effective rooting depth of the soil.							
Coral gum eucalyptus	x	x	x	x			Sunny sites; 15 to 20 feet high; light or golden green foliage; coral red and yellow flowers intermittent throughout year.
Cork oak	x	x	x	x			Sunny sites; 70 to 100 feet high; 70 to 100 feet wide, green foliage, yellow in alkaline soil.
Evergreen maple	x	x	x				Sunny sites, 20 to 25 feet high; 15 to 20 feet wide.
Feather bush	x	x	x	x			Sunny sites, 8 to 15 feet high; 12 to 18 feet wide, feathery green foliage, sensitive to frost.
Fuchsia eucalyptus	x	x	x	x			Sunny sites; 12 feet high; grey-brown foliage; red flowers intermittent throughout year.
Ghost gum eucalyptus	x	x	x	x			Sunny sites; 40 feet high; 40 feet wide; gray-green foliage; no litter; good in lawns.
Holly oak	x	x					Sunny sites; 40 to 70 feet high; 40 to 70 feet wide; green foliage.
Hollywood juniper	x	x	x	x		x	Sunny sites; 30 feet high, 1 to 3 feet wide, green foliage, twisted columnar form, nitrogen and salt sensitive; mites a common problem.
Juniper	x	x	x	x		x	Sunny sites, 20 to 30 feet high, 3 to 5 feet wide, blue green foliage; columnar form, nitrogen and salt sensitive, mites a common problem.
Longflower marlock eucalyptus	x	x	x	x			Sunny sites; 25 to 35 feet high; light golden green foliage; clusters of cream to green flowers.
Loquat	x	x	x				Partly shady to sunny sites; 15 to 30 feet high; 15 to 30 feet wide, green foliage; white flowers in fall; orange fruit; susceptible to fire blight.
Macrocarpa eucalyptus	x	x	x	x			Sunny sites; 4 to 15 feet high; gray-blue foliage; pink, white, or red flowers, 4 to 7 inches wide; sensitive to overwatering.
Mondel pine	x	x	x	x			Sunny sites; 30 to 50 feet high; bluish green to dark green foliage.
Nichol's willowleaf peppermint eucalyptus	x	x	x	x			Sunny sites; 40 feet high; 30 to 35 feet wide, green foliage, commonly tinged with purple; whitish flowers mostly in summer, grows fast.
Red-cap gum eucalyptus	x	x	x	x			Sunny sites, 10 to 30 feet high, 10 to 25 feet wide; green foliage; yellow flowers intermittent throughout year; cone-shaped seed capsules.

TABLE 7.--LANDSCAPE PLANTINGS--Continued

Common name	Horticultural group						Management and plant characteristics
	1	2	3	4	5	6	
EVERGREEN TREES--Continued							
[Rooting depth is from 4 to 10 feet but can vary according to the effective rooting depth of the soil.]							
Rocky Mountain juniper	x	x	x	x		x	Sunny sites; 10 to 15 feet high; 2 to 4 feet wide; gray-blue to green foliage; upright form, nitrogen and salt sensitive; mites a common problem.
Silver-dollar gum	x	x	x	x			Partly shady to sunny sites; 20 to 50 feet high, 20 to 40 feet wide; green-gray foliage, creamy white flowers in spring and summer.
Strawberry tree	x	x	x				Partly to fully shady sites; 8 to 35 feet high, 8 to 35 feet wide; dark green foliage; white flowers, round red and yellow fruit in fall and winter.
White ironbark	x	x	x	x			Sunny sites; 20 to 80 feet high; gray-green foliage, white flowers intermittently in winter and spring.
White peppermint eucalyptus	x	x	x	x			Sunny sites; 20 to 50 feet high; dark green foliage; creamy white flowers from June to October.
GROUND COVER PLANTS							
[Rooting depth is approximately 24 inches but can vary according to the effective rooting depth of the soil]							
Aarons-beard	x	x	x	x		x	Partly shady sites, 1 foot high; plant 18 inches apart; green foliage; yellow flowers in summer.
Abelia	x	x	x				Sunny sites; 3 to 5 feet high; 3 to 6 feet wide, evergreen foliage; small lilac flowers from June to October; low tolerance of s[illegible].
Blue fescue	x	x	x	x		x	Partly shady or sunny sites, 4 to 10 inches high; blue-gray foliage; plant 6 to 15 inches apart, no foot traffic.
Brunnera	x	x	x				Partly shady sites; 18 inches high; dark green foliage; blue flowers that have yellow centers, blooms in spring.
Bugleweed	x	x	x				Partly shady to sunny sites; 2 to 4 inches wide, dark green foliage; blue flower spikes; blooms in spring; subject to root knot nematodes, root rot, and fungal diseases.
Butcher's broom	x	x					Partly shady to shady sites; 1 to 4 feet high; dark green foliage; greenish white flowers; susceptible to chlorosis.
Catmint	x	x	x			x	Sunny sites; 2 feet high; plant 12 to 18 inches apart; gray-green foliage; lavender blue flowers early in summer.
Creeping liriope	x	x	x	x			Shady sites; 8 to 9 inches high, deep green grasslike foliage; pale lilac to white flowers, mow once in spring.

TABLE 7.--LANDSCAPE PLANTINGS--Continued

Common name	Horticultural group						Management and plant characteristics
	1	2	3	4	5	6	
GROUND COVER PLANTS--Continued							
Rooting depth is approximately 24 inches but can vary according to the effective rooting depth of the soil.							
Crownvetch	x	x	x	x		x	Shady to sunny sites; 2 feet high; lavender pink flowers, dormant during cold winter.
Cymbalaria	x	x	x				Shady sites; dainty creeper; can be used as ground cover in small, cool shady areas; lilac blue flower.
Dwarf boxwood	x	x	x				Partly shady sites; 9 to 12 inches high; dark green foliage, bronze in fall and winter.
Forget-me-not	x	x	x				Partly shady sites; 6 to 12 inches high; green foliage, blue flowers; has a long flowering season, reseeds itself.
Gazania	x	x	x			x	Sunny sites; silver or green foliage; 6 to 12 inches high; multicolored daisy-like flowers late in spring, early in summer, or intermittently throughout the year.
Germander	x	x	x			x	Sunny sites; 1 foot high, 2 feet wide; plant 2 feet apart; dark green foliage; red, purple, or white flowers in summer.
Lavender cotton	x	x	x	x	x	x	Sunny sites; 1 to 2 feet high; whitish gray leaves; yellow flowers in summer; plant 3 feet apart; needs clipping.
Mondo grass							Partly shady sites; slow to spread; dark green foliage, light lilac flowers in summer; blue fruit.
Nandina	x	x					Partly shady sites, 8 to 10 inches high, green foliage, bright red in fall and winter.
Prostrate juniper	x	x	x	x		x	Partly shady sites, 1 to 2 feet high; 6 to 8 feet wide; green foliage; spreading form; nitrogen and salt sensitive; mites a common problem.
Pyracantha	x	x	x				Sunny sites; 2 to 3 feet high; plant 4 to 5 feet apart, green foliage; white flowers in March and April; red fruit; strongly chlorotic.
Saponaria	x	x	x	x	x	x	Sunny sites, 1 foot high; 3 feet wide; dark green foliage; pink flowers in spring.
Spanish broom	x	x	x	x		x	Sunny sites; 1 to 2 feet high; green foliage; golden yellow flowers in May and June.
Spring cinquefoil	x	x	x	x		x	Partly shady to sunny sites, 2 to 6 inches high, bright green foliage; yellow flowers in spring and summer; fast growing.
St.-Johnswort	x	x	x	x		x	Partly shady sites; 6 to 12 inches high; green foliage; yellow flowers from April to June.
Wintergreen	x	x	x				Partly shady sites; 6 inches high; plant 12 inches apart, small white flowers in summer; tolerates wet soil.

TABLE 7.--LANDSCAPE PLANTINGS--Continued

Common name	Horticultural group 1	2	3	4	5	6	Management and plant characteristics
							LAWN SUBSTITUTES
							[Rooting depth is approximately 24 inches but can vary according to the effective rooting depth of the soil]
Chamomile	x	x	x	x		x	Partly shady to sunny sites; 3 to 12 inches high, plant 12 inches apart, light green foliage, yellow flowers in summer.
Emerald zoysia	x	x	x	x		x	Partly shady to sunny sites; cut for lawn 3/4 inch high; green in spring, straw colored in winter; dense, wiry blades, hard to cut.
Hippocrepis	x	x	x	x		x	Sunny sites; 3 inches high; 3 feet wide; green foliage; golden yellow flowers in spring, withstands light foot traffic.
Irish moss	x	x	x				Partly shady sites; 3 inches high; plant 6 inches apart; green foliage; withstands some foot traffic; control snails, slugs, and cutworms.
Lippia	x	x	x	x		x	Sunny to semishady sites; 6 to 12 inches high, green foliage; lilac flowers from spring to fall; susceptible to crown gall and nematodes.
							ROCK GARDEN PLANTS
							[Rooting depth is approximately 24 inches but can vary according to the effective rooting depth of the soil]
Bellflower	x	x	x			x	Partly shady sites, 1 to 6 feet high, green foliage; multicolored flowers, blooms from spring to fall; nearly 300 species, trailing species used as ground cover.
Bugle ajuga	x	x	x				Sunny sites, 5 to 14 inches high, grayish hairy stems; blue flower spikes.
Evergreen candytuft	x	x	x	x		x	Partly shady to sunny sites; 8 to 12 inches high; 8 to 12 inches wide; dark green foliage, white flowers; blooms from early in spring to June, can be cut for bouquets; can use as a ground cover in small areas.
Fountain grass	x	x	x			x	Partly shady to sunny sites; 3 to 6 feet high, 3 to 6 feet wide; purplish flower spikes in summer; dormant in winter.
Germander	x	x	x	x		x	Sunny sites, 1 foot high; 2 feet wide; dark green foliage; red, purple, or white flowers in summer; sensitive to overwatering.
Halimiocistus	x	x	x	x		x	Sunny sites; 2 feet high, spreads to 3 feet or more, gray-green foliage, white flower clusters in summer; sensitive to overwatering.
Prostrate juniper	x	x	x	x		x	Partly shady sites; 1 to 2 feet high; 6 to 8 feet wide, green foliage; spreading form, nitrogen and salt sensitive; mites a common problem.

TABLE 7.--LANDSCAPE PLANTINGS--Continued

Common name	Horticultural group						Management and plant characteristics
	1	2	3	4	5	6	
ROCK GARDEN PLANTS--Continued							
Rooting depth is approximately 24 inches but can vary according to the effective rooting depth of the soil.							
Rosemary barberry	x	x	x	x		x	Partly shady to sunny sites; 18 inches high; evergreen foliage, orange flower clusters.
Rusty cinquefoil	x	x	x			x	Partly shady to sunny sites; 2 to 4 inches high, gray hairy foliage; pale yellow flowers.
Snow-in-summer	x	x	x	x		x	Partly shady to sunny sites; 6 to 8 inches high, 2 to 3 feet wide; silvery gray foliage; snowy white flowers early in summer; also useful as a ground cover.
Spirea	x	x	x			x	Partly shady to sunny sites, 12 to 18 inches high; green foliage; pink flowers in July and August.
St. Johnswort	x	x	x			x	Partly shady sites; 6 to 12 inches high, green foliage, yellow flower clusters from April to June.
Sunrose	x	x	x			x	Sunny sites; 6 to 8 inches high; spreads to 3 feet; green foliage; wide variety of flower colors; blooms from April to June; sensitive to overwatering.
Tamarix juniper	x	x	x	x		x	Sunny sites; 2 to 3 feet high; 10 to 20 feet wide; blue-green foliage; spreading form, nitrogen and salt sensitive; mites a common problem.
Woolly yarrow	x	x	x	x		x	Partly shady to sunny sites; spreading mat of dark green fernlike foliage golden flowers 6 to 10 inches long in summer.
Yucca	x	x	x	x		x	Sunny sites; 3 to 6 feet high; 3 to 5 feet wide, green or variegated foliage; white flowers in May, subject to leaf blight.

TABLE 8.--RECREATIONAL DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
105*:					
McCullough	Severe: flooding.	Slight	Moderate: slope.	Slight	Slight.
Jean	Severe: flooding.	Slight	Moderate slope, small stones.	Slight	Severe droughty.
[illegible]	Slight	Slight	Moderate: slope.	Slight	Moderate: droughty.
[illegible] Arizo	Severe: flooding, small stones.	Severe: small stones.	Severe: large stones, small stones.	Severe: large stones.	Severe small stones, large stones, droughty.
112, 113 Arizo	Severe: flooding, small stones.	Severe: small stones.	Severe: small stones.	Slight	Severe: small stones, droughty.
[illegible] Arizo	Severe: small stones.	Severe: small stones.	Severe: small stones.	Slight	Severe: small stones, droughty.
[illegible]26 Bluepoint	Severe: flooding.	Slight	Slight	Slight	Moderate: droughty.
127 Bluepoint	Slight	Slight	Slight	Slight	Moderate: droughty.
128 Bluepoint	Slight	Slight	Severe: small stones.	Slight	Moderate: small stones, droughty.
[illegible] Bluepoint	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: droughty, slope.
130*:					
Bracken	Severe: large stones, small stones.	Severe: large stones, small stones.	Severe: large stones, small stones.	Severe: large stones.	Severe: small stones, large stones, droughty.
[illegible]	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: large stones, slope.	Moderate: large stones.	Severe: large stones.
[illegible] Bracken	Severe: small stones.	Severe: small stones.	Severe: small stones.	Severe: small stones.	Severe: small stones, droughty.
[illegible]*:					
[illegible]	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: small stones.	Severe small stones, droughty, slope.
Rock outcrop.					

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
134 Bracken	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: small stones.	Severe: small stones, droughty, slope.
1[illegible] [illegible]	Severe: small stones, excess sodium, excess salt.	Severe: small stones, excess sodium, excess salt.	Severe: small stones, excess sodium.	Severe: small stones.	Severe: excess salt, excess sodium, small stones.
150 Cave	Severe: cemented pan.	Severe: cemented pan.	Severe: large stones, small stones, cemented pan.	Moderate: large stones.	Severe: large stones, thin layer.
151 Cave	[illegible] cemented pan.	Severe: cemented pan.	Severe: cemented pan.	[illegible]	Severe: thin layer.
152 Cave	Severe: cemented pan.	Severe: cemented pan.	Severe: small stones, cemented pan.	Slight	Severe: thin layer.
1[illegible] Cave	[illegible]	Severe [illegible]	Severe: slope, small stones, cemented pan.	[illegible]	Severe: thin layer.
[illegible] Destazo	[illegible] large stones.	Moderate: large stones.	Severe: large stones.	Moderate: large stones.	Severe: large stones.
181*: Caliza	Severe: large stones, small stones.	Severe: large stones, small stones.	Severe: large stones, small stones.	Severe: small stones.	Severe: small stones, large stones, droughty.
Pittman	Severe: large stones, small stones.	Severe: large stones, small stones.	Severe: large stones, small stones.	Severe: small stones.	Severe: small stones, large stones, droughty.
182*: [illegible]	Severe: large stones, small stones.	[illegible] large stones, small stones.	[illegible] small stones.	Severe: small stones.	Severe: small stones, large stones, droughty.
Pittman	Severe: large stones, small stones.	[illegible] large stones, small stones.	Severe: large stones, small stones.	[illegible] small stones.	Severe: small stones, large stones, droughty.
Arizo	Severe: flooding, small stones.	[illegible]	Severe: small stones.	Slight	[illegible] droughty.
[illegible] [illegible]	[illegible] large stones, small stones.	[illegible] large stones, small stones.	Severe: large stones, slope, small stones.	Moderate: large stones.	Severe: small stones, large stones, droughty.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
184 Caliza	Severe: flooding, small stones.	Severe: small stones.	Severe: small stones.	Slight	Severe small stones, droughty.
187 Caliza	Severe: large stones, small stones.	Severe: large stones, small stones.	Severe: large stones, small stones.	Severe: small stones.	Severe: small stones, large stones, droughty.
190 Dalian	Severe: small stones.	Severe: small stones.	Severe: small stones.	Severe: small stones.	Severe: small stones.
191 Dalian	Severe: flooding.	Moderate: small stones.	Severe: large stones, small stones.	Slight	Moderate: small stones, droughty.
192*:					
Dalian	Severe: flooding, small stones.	Severe: small stones.	Severe: small stones.	Severe: small stones.	Severe: small stones.
McCullough	Severe flooding, small stones.	Severe: small stones.	Severe: small stones.	Severe: small stones.	Severe: small stones.
200 Glencarb	Severe: flooding.	Slight	Slight	Slight	Slight.
206 Glencarb	Severe: flooding.	Moderate excess salt, dusty.	Moderate: flooding, dusty, excess salt.	Severe erodes easily.	Moderate excess salt, droughty, flooding.
222 Glencarb	Severe: flooding.	Moderate: excess salt.	Moderate: excess salt.	Severe: erodes easily.	Moderate: excess salt, droughty.
236 Glencarb	Severe flooding.	Moderate excess salt, dusty.	Moderate: dusty, excess salt.	Slight	Moderate excess salt.
237 Glencarb	Severe flooding.	Moderate dusty.	Moderate: dusty.	Moderate. dusty.	Slight.
240 Goodsprings	Severe cemented pan.	Severe: cemented pan.	Severe: small stones, cemented pan.	Slight	Severe thin layer.
252 Grapevine	Severe flooding.	Moderate dusty.	Moderate dusty.	Severe erodes easily.	Slight.
255 Grapevine	Severe: flooding.	Slight	Moderate: slope.	Slight	Slight.
260 Jean	Severe flooding.	Moderate small stones.	Severe small stones.	Slight	Severe droughty.
262*:					
Jean	Severe flooding.	Moderate: small stones.	Severe small stones.	Slight	Severe droughty.
Jean	Severe flooding, small stones.	Severe small stones.	Severe: small stones.	Severe: small stones.	Severe: small stones.
Goodsprings	Severe: flooding, cemented pan.	Severe cemented pan.	Severe: small stones, cemented pan.	Slight	Severe. thin layer.

See footnote at end of table.

TABLE [illegible].--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
264*:					
Jea[illegible]	Severe: flooding.	Moderate: small stones.	Severe: small stones.	Slight	Severe: droughty.
Jean	Severe: flooding, small stones.	Severe: small stones.	Severe: small stones.	Severe: small stones.	Severe: small stones.
[illegible]	Severe: flooding, small stones.	Severe: small stones.	Severe: small stones.	Severe: small stones.	Severe: small stones, droughty.
[illegible]	Severe: flooding, excess salt.	Severe: excess salt.	Severe: excess salt.	Severe: erodes easily.	Severe: excess salt.
[illegible]	Severe: flooding, excess salt.	Severe: excess salt.	Severe: excess salt.	Moderate: wetness, dusty.	Severe: excess salt.
[illegible]	Severe: flooding, excess salt.	Severe: excess salt.	Severe: excess salt.	Severe: erodes easily.	Severe: excess salt.
301, [illegible] Las Vegas	Severe: flooding, cemented pan.	Severe: cemented pan.	Severe: small stones, cemented pan.	Slight	Severe: thin layer.
302*:					
Las Vegas	Severe: flooding, cemented pan.	Severe: cemented pan.	Severe: small stones, cemented pan.	Slight	Severe: thin layer.
McCarran	Severe: flooding, excess salt.	Severe: excess salt.	Severe: excess salt.	Slight	Severe: excess salt.
[illegible]	Severe: flooding.	Moderate: dusty.	Moderate: slope, dusty.	Severe: erodes easily.	Slight.
305*:					
Las Vegas	Severe: flooding, cemented pan.	Severe: cemented pan.	Severe: small stones, cemented pan.	Slight	Severe: thin layer.
Destaz[illegible]	Severe: flooding.	Slight	Slight	Slight	Severe: droughty.
[illegible]*:					
Las Vegas	Severe: flooding, cemented pan.	Severe: cemented pan.	Severe: small stones, cemented pan.	Slight	Severe: thin layer.
[illegible]	Severe: flooding.	Moderate: excess salt.	Moderate: slope, small stones, cemented pan.	Slight	Moderate: excess salt, thin layer.
[illegible] McCarran	Severe: flooding, excess salt.	Severe: excess salt.	Severe: excess salt.	Slight	Severe: excess salt.
[illegible] McCarran	Severe: flooding, large stones, small stones.	Severe: large stones, small stones.	Severe: large stones, small stones.	Severe: large stones.	Severe: small stones, large stones.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
341: Paradise	Severe: flooding, excess salt.	Severe: excess salt.	Severe: excess salt.	Severe: erodes easily.	Severe: excess salt.
360*: Rock outcrop.					
St. Thomas	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope, small stones.	Severe: large stones.	Severe: small stones, large stones, droughty.
380: Skyhaven	Severe: flooding.	Moderate: excess salt.	Moderate: slope, small stones, cemented pan.	Slight	Moderate: excess salt, thin layer.
390: Spring	Severe: flooding, excess salt.	Severe: excess salt.	Severe: excess salt.	Slight.	Severe: excess salt.
400: Tencee	Severe: small stones, cemented pan.	Severe: small stones, cemented pan.	Severe: small stones, cemented pan.	Severe: small stones.	Severe: small stones, thin layer.
415: Aztec	Severe: small stones.	Severe: small stones.	Severe: small stones.	Severe: small stones.	Severe: small stones.
417*: Aztec	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: small stones.	Severe: slope, small stones.
Rock outcrop.					
418*: Aztec	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight	Moderate: slope, small stones.
Nickel	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight	Severe: droughty.
Knob Hill	Slight	Slight	Moderate: slope, small stones.	Slight	Moderate: droughty.
419*: Aztec	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight	Moderate: slope, small stones.
Bracken	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: small stones.	Severe: small stones, droughty, slope.
430: Knob Hill	Slight	Slight	Moderate: slope, small stones.	Slight	Moderate: droughty.
440: Nickel	Severe: small stones.	Severe: small stones.	Severe: small stones.	Slight	Severe: small stones, droughty.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
451-------------------- Cave Variant	Severe: slope, large stones, small stones.	Severe: slope, large stones, small stones.	Severe: large stones, slope, small stones.	Moderate: large stones, slope.	Severe: small stones, large stones, slope.
481-------------------- Hobog	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, thin layer.
484-------------------- Hobog	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones.	Severe: large stones, slope.	Severe: large stones, slope, thin layer.
500*:					
[illegible]----------------	Severe: large stones, small stones.	Severe: large stones, small stones.	Severe: large stones, slope, small stones.	Moderate: large stones.	Severe: small stones, large stones, droughty.
Ak[illegible]------------------	Severe: depth to rock	Severe: depth to rock.	Severe: small stones, depth to rock.	Severe: small stones.	Severe: droughty, thin layer.
501-------------------- Canutio	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight-----------	Moderate: small stones, large stones, droughty.
502*:					
Canutio----------------	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight-----------	Moderate: small stones, large stones, droughty.
[illegible]--------------------	Severe: cemented pan.	Severe: cemented pan.	Severe: small stones, cemented pan.	Slight-----------	Severe: thin layer.
[illegible]*:					
Canutio----------------	Severe: slope, large stones, small stones.	Severe: slope, large stones, small stones.	Severe: large stones, slope, small stones.	Moderate: large stones, slope.	Severe: small stones, large stones, droughty.
Akela------------------	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: droughty.
[illegible]*:					
Akela------------------	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: droughty.
Rock outcrop.					
[illegible]-------------------- Weiser	Severe: small stones.	Severe: small stones.	Severe: small stones.	Severe: small stones.	Severe: small stones, droughty.
542*:					
Weiser-----------------	Severe: small stones.	Severe: small stones.	Severe: small stones.	Severe: small stones.	Severe: small stones, droughty.
[illegible]------------------	Severe: small stones.	Severe: small stones.	Severe: small stones.	Severe: small stones.	Severe: small stones.
[illegible]*:					
[illegible]-----------------	Severe: small stones.	Severe: small stones.	Severe: small stones.	Severe: small stones.	Severe: small stones, droughty.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
545*: Goodsprings	Severe: small stones, cemented pan.	Severe: small stones, cemented pan.	Severe: small stones, cemented pan.	Severe: small stones.	Severe: small stones, thin layer.
600*. Slickens					
605*. Dumps					
610*. Pits					
615*. Urban land					
630*. Badlands					
635*, 640*. Rock outcrop					
645*. Pits					

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--BUILDING SITE DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
105*:						
[illegible]	[illegible] cutbanks cave.	[illegible] flooding.	[illegible] flooding.	[illegible] flooding.	[illegible] flooding, excess gypsum.	[illegible]
Jean	Severe cutbanks cave.	Severe: flooding.	Severe flooding.	Severe: flooding.	Moderate: flooding, large stones.	Severe. droughty.
Bluepoint	Severe: cutbanks cave.	Slight	Slight	Slight	Slight	Moderate. droughty.
[illegible]	Severe: cutbanks cave, large stones.	Severe: flooding, large stones.	Severe flooding, large stones.	Severe. flooding, large stones.	Severe. large stones.	Severe. small stones, large stones, droughty.
[illegible]	Severe cutbanks cave.	Severe flooding.	Severe flooding	Severe: flooding.	Severe flooding	Severe. small [illegible], droughty.
[illegible] Arizo	[illegible] cutbanks cave.	[illegible] flooding, excess gypsum.	[illegible] flooding, excess gypsum.	[illegible] flooding, excess gypsum.	[illegible] excess gypsum.	[illegible] small stones, droughty.
[illegible] Arizo	[illegible] cutbanks cave.	[illegible] large stones.	[illegible] large stones.	[illegible] slope, large stones.	[illegible] large stones.	[illegible] small stones, droughty.
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	Severe: cutbanks cave.	Slight	Slight	Slight	Slight	Moderate: droughty.
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible] droughty.
129 Bluepoint	Severe: cutbanks cave.	Moderate. slope	Moderate: slope	Severe: slope	Moderate: slope	[illegible]
130*:						
[illegible]	[illegible]	[illegible] excess gypsum.	[illegible] excess gypsum.	[illegible] excess gypsum.	[illegible] excess gypsum.	[illegible] small stones, large stones, droughty.
[illegible]	[illegible] slope.	[illegible] slope.	[illegible] slope.	[illegible] slope.	[illegible] slope.	Severe large stones.
[illegible] Braker	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible] droughty.
133*:						
[illegible]	[illegible]	Severe: slope, excess gypsum.	Severe: slope, excess gypsum.	Severe. slope, exess gypsum.	Severe: slope, excess gypsum.	Severe: small stones, droughty, slope.
Rock outcrop.						

See footnote at end of table.

[illegible]--BUILDING SITE DEVELOPMENT--Continued

[illegible] name and map symbol	[illegible] excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	[illegible] roads and streets	Lawns and landscaping
[illegible] [illegible]	Severe: slope.	Severe: slope, excess gypsum.	Severe: slope, excess gypsum.	Severe: slope, excess gypsum.	Severe: slope, excess gypsum.	Severe: small stones, droughty, slope.
[illegible] [illegible]	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Moderate: shrink-swell.	Severe: excess salt, excess sodium, small stones.
[illegible] Cave	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Severe: large stones, thin layer.
[illegible] Cave	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Severe: thin layer.
[illegible] Cave	Severe: cemented pan, cutbanks cave.	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Severe: thin layer.
[illegible] Cave	Severe: cemented pan, cutbanks cave.	Severe: cemented pan.	Severe: cemented pan.	Severe: slope, cemented pan.	Severe: cemented pan.	Severe: thin layer.
15[illegible] Destazo	Slight	Slight	Slight	Slight	Slight	Severe: large stones.
[illegible] [illegible]	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight	Severe: small stones, large stones, droughty.
[illegible]	Severe: cemented pan, cutbanks cave.	Moderate: cemented pan, large stones.	Severe: cemented pan.	Moderate: slope, cemented pan, large stones.	Moderate: cemented pan, large stones.	Severe: small stones, large stones, droughty.
152*: [illegible]	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight	Severe: small stones, large stones, droughty.
[illegible]	Severe: cemented pan, cutbanks cave.	Moderate: cemented pan, large stones.	Severe: cemented pan.	Moderate: slope, cemented pan, large stones.	Moderate: cemented pan, large stones.	Severe: small stones, large stones, droughty.
[illegible]	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: small stones, droughty.
[illegible] [illegible]	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight	Severe: small stones, large stones, droughty.
156 [illegible]	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Severe: small stones, droughty.
157 [illegible]	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight	Severe: small stones, large stones, droughty.
[illegible] [illegible]	Slight	Slight	Slight	Slight	Slight	Severe: small stones

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
191 Dalian	Slight	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Moderate: small stones, droughty.
192*: Dalian	Slight	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Severe: small stones.
McCullough	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding, excess gypsum.	Severe: small stones.
200 Glencarb	Slight	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: low strength, flooding, shrink-swell.	Slight.
215 Glencarb	Moderate: wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength, flooding.	Moderate: excess salt, droughty, flooding.
222 Glencarb	Moderate: wetness.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength.	Moderate: excess salt, droughty.
236 Glencarb	Slight	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: low strength, flooding, shrink-swell.	Moderate: excess salt.
237 Glencarb	Moderate: cemented pan.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: low strength, flooding, shrink-swell.	Slight.
240 Goodsprings	Severe: cemented pan, cutbanks cave.	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Severe: thin layer.
252, 255 Grapevine	Slight	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Slight.
261 Jean	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding, large stones.	Severe: droughty.
262*: Jean	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding, large stones.	Severe: droughty.
Jean	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: small stones.
Goodsprings	Severe: cemented pan, cutbanks cave.	Severe: flooding, cemented pan.	Severe: flooding, cemented pan.	Severe: flooding, cemented pan.	Severe: cemented pan.	Severe: thin layer.
263*: Jean	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding, large stones.	Severe: droughty.
Jean	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: small stones.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
[illegible]----------------- [illegible]	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding, large stones.	Severe: small stones, droughty.
[illegible]----------------- [illegible]	Moderate: too clayey, wetness.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength.	Severe: excess salt.
[illegible]----------------- [illegible]	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: low strength.	Severe: excess salt.
282----------------- [illegible]	Moderate: too clayey, wetness.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength.	Severe: excess salt.
300, 301----------- Las Vegas	Severe: cemented pan.	Severe: flooding, cemented pan.	Severe: flooding, cemented pan.	Severe: flooding, cemented pan.	Severe: cemented pan.	Severe: thin layer.
[illegible]*:						
Las Vegas----------	Severe: cemented pan.	Severe: flooding, cemented pan.	Severe: flooding, cemented pan.	Severe: flooding, cemented pan.	Severe: cemented pan.	Severe: thin layer.
McCarran-----------	Slight-----------	Severe: flooding, excess gypsum.	Severe: flooding, excess gypsum.	Severe: flooding, excess gypsum.	Severe: excess gypsum.	Severe: excess salt.
Grapevine----------	Slight-----------	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.	[illegible]
305*:						
Las Vegas----------	Severe: cemented pan.	Severe: flooding, cemented pan.	Severe: flooding, cemented pan.	Severe: flooding, cemented pan.	Severe: cemented pan.	Severe: thin layer.
Destazo------------	Slight-----------	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding, shrink-swell.	Severe: droughty.
307*:						
Las Vegas----------	Severe: cemented pan.	Severe: flooding, cemented pan.	Severe: flooding, cemented pan.	Severe: flooding, cemented pan.	Severe: cemented pan.	Severe: thin layer.
Skyhaven-----------	Severe: cemented pan.	Severe: flooding.	Severe: flooding, cemented pan.	Severe: flooding.	Moderate: cemented pan, flooding, shrink-swell.	Moderate: excess salt, thin layer.
[illegible]----------------- McCarran	Slight-----------	Severe: flooding, excess gypsum.	Severe: flooding, excess gypsum.	Severe: flooding, excess gypsum.	Severe: excess gypsum.	Severe: excess salt.
[illegible]----------------- McCarran	Slight-----------	Severe: flooding, excess gypsum.	Severe: flooding, excess gypsum.	Severe: flooding, excess gypsum.	Severe: excess gypsum.	Severe: small stones, large stones.
[illegible]----------------- [illegible]	Moderate: wetness.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Severe: excess salt.
360*:						
Rock outcrop.						
St. Thomas---------	Severe: depth to rock, large stones, slope.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.	Severe: small stones, large stones, droughty.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
[illegible]: [illegible]	Severe: cemented pan.	Severe: flooding.	Severe: flooding, cemented pan.	Severe: flooding.	Severe: cemented pan, flooding, shrink-swell.	Moderate: excess salt, thin layer.
[illegible]: [illegible]	Slight	Severe: flooding, excess gypsum.	Severe: flooding, excess gypsum.	Severe: flooding, excess gypsum.	Severe: low strength, excess gypsum.	[illegible]: excess salt.
[illegible]: Tencee	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Severe: small stones, thin layer.
[illegible]: Aztec	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight	Severe: small stones.
417*: Aztec	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, small stones.
Rock outcrop.						
418*: Aztec	Severe: cutbanks cave.	Moderate: slope, excess gypsum.	Moderate: slope, excess gypsum.	Severe: slope.	Moderate: slope, excess gypsum.	Moderate: slope, small stones.
[illegible]	Moderate: depth to rock, slope.	Moderate: slope.	Moderate: depth to rock, slope.	Severe: slope.	Moderate: slope.	Severe: droughty.
[illegible]	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight	Moderate: droughty.
419*: Aztec	Severe: cutbanks cave.	Moderate: slope, excess gypsum.	Moderate: slope, excess gypsum.	Severe: slope.	Moderate: slope, excess gypsum.	Moderate: slope, small stones.
[illegible]	Severe: slope.	Severe: slope, excess gypsum.	Severe: slope, excess gypsum.	Severe: slope, excess gypsum.	Severe: slope, excess gypsum.	Severe: small stones, droughty, slope.
430: Knob Hill	Severe: cutbanks cave.	Slight	Slight	Slight	Slight	Moderate: droughty.
[illegible]: Nickel	Moderate: depth to rock.	Slight	Moderate: depth to rock.	Moderate: slope.	Slight	Severe: small stones, droughty.
[illegible]: Cave Variant	Severe: cemented pan, slope.	Severe: slope, cemented pan.	Severe: cemented pan, slope.	Severe: slope, cemented pan.	Severe: cemented pan, slope.	Severe: small stones, large stones, slope.
[illegible]: [illegible]	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, thin layer.
[illegible]: [illegible]	Severe: depth to rock, large stones, slope.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.	Severe: large stones, slope, [illegible].
[illegible]*: [illegible]	Moderate: depth to rock, slope.	Moderate: slope.	Moderate: depth to rock, slope.	Severe: slope.	Moderate: slope.	Severe: small stones, large stones, droughty.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
[illegible]*: Akela	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe droughty, thin layer.
[illegible]0: Canutio	Moderate: large stones.	Moderate: large stones.	Moderate: large stones.	Moderate: large stones.	Moderate: large stones.	Moderate: small stones, large stones, droughty.
[illegible]*: Canutio	Moderate: large stones.	Moderate: large stones.	Moderate: large stones.	Moderate: slope, large stones.	Moderate: large stones.	Moderate: small stones, large stones, droughty.
Cave	Severe: cemented pan, cutbanks cave.	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Severe: thin layer.
[illegible]*: Canutio	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: small stones, large stones, droughty.
Akela	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: droughty.
510*: Akela	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: droughty.
Rock outcrop.						
[illegible]: Weiser	Slight	Slight	Slight	Moderate: slope.	Slight	Severe: small stones, droughty.
542*: Weiser	Slight	Slight	Slight	Moderate: slope.	Slight	Severe: small stones, droughty.
[illegible]	Severe: cutbanks cave.	Moderate: excess gypsum.	Moderate: excess gypsum.	Moderate: slope, excess gypsum.	Moderate: excess gypsum.	Severe: small stones.
[illegible]*: Weiser	Slight	Slight	Slight	Slight	Slight	Severe: small stones, droughty.
Goodsprings	Severe: cemented pan, cutbanks cave.	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Severe: small stones, thin layer.
600*. Slickens						
605*. Dumps						
610*. Pits						
615*. Urban land						

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
630*. Badlands						
635*, 640*. Rock outcrop						
645*. Pits						

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--SANITARY FACILITIES

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
[illegible]*:					
McCullough	Severe: poor filter, excess gypsum.	Severe: seepage, flooding, excess gypsum.	Severe: too sandy.	Moderate: flooding.	Poor: too sandy.
[illegible]	Severe: poor filter.	Severe: seepage, flooding.	Severe: too sandy.	Moderate: flooding.	Poor: seepage, [illegible], small stone.
Bluepoint	Severe: poor filter.	Severe: seepage.	Moderate: too sandy.	Slight	Fair: too sandy.
[illegible] Arizo	Severe: poor filter, large stones.	Severe: seepage, flooding.	Severe: too sandy, large stones.	Moderate: flooding.	Poor: seepage, too sandy, small stones.
[illegible] Arizo	Severe: flooding, poor filter.	Severe: seepage, flooding.	Severe: flooding, too sandy.	Severe: flooding.	Poor: seepage, too sandy, small stones.
[illegible] Arizo	Severe: [illegible]	Severe: [illegible], flooding.	Moderate: [illegible], too sandy.	Moderate: [illegible]	Poor: [illegible], small stones.
[illegible] Arizo	Severe: poor filter.	Severe: seepage.	Severe: too sandy.	Slight	Poor: seepage, too sandy, small stones.
120 [illegible]	Severe: poor filter.	Severe: [illegible], flooding.	Severe: [illegible], too sandy.	Moderate: [illegible], wetness.	Poor: [illegible]
127, 128 Bluepoint	Severe: poor filter.	Severe: seepage.	Moderate: too sandy.	Slight	Fair: too [illegible]
129 Bluepoint	Severe: poor filter.	Severe: seepage, slope.	Moderate: slope, too sandy.	Moderate: slope.	Fair: too [illegible], slope.
130*:					
[illegible]	[illegible] excess gypsum.	[illegible] seepage, excess gypsum.	[illegible] depth to rock.	[illegible] depth to rock.	[illegible] area reclaim, small stones.
Destazo	Severe: percs slowly.	Severe: seepage, slope.	Moderate: slope.	Moderate: slope.	Poor: small stones.
[illegible]	Severe: excess gypsum.	Severe: seepage, excess gypsum.	Severe: depth to rock.	Moderate: depth to rock.	Fair: area reclaim, small stones.
[illegible]*:					
[illegible]	Severe: slope, excess gypsum.	Severe: seepage, slope, excess gypsum.	Severe: depth to rock, slope.	Severe: slope.	Poor: slope.
Rock outcrop.					

See footnote at end of table.

TABLE 18.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
[illegible]	Severe: slope, excess gypsum.	Severe: seepage, slope, excess gypsum.	Severe: depth to rock, slope.	Severe: slope.	Poor: slope.
[illegible]	Severe: percs slowly.	Severe: seepage.	Slight	Slight	Poor: small stones.
[illegible]	Severe: cemented pan.	Severe: cemented pan, large stones.	Severe: cemented pan, large stones.	Severe: cemented pan.	[illegible] area reclaim.
[illegible]	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Poor: area reclaim.
[illegible]	Severe: cemented pan.	Severe: seepage, cemented pan.	Severe: cemented pan.	Severe: cemented pan.	[illegible]
[illegible]	Severe: cemented pan.	Severe: seepage, cemented pan, slope.	Severe: cemented pan.	Severe: cemented pan.	[illegible] area reclaim, small stones.
[illegible] Destazo	Severe: percs slowly.	Severe: seepage.	Slight	Slight	Poor: small stones.
181*: Caliza	Severe: poor filter.	Severe: seepage.	Severe: too sandy.	Slight	Poor: seepage, too sandy, small stones.
[illegible]	[illegible]	[illegible] cemented pan.	[illegible] too sandy.	[illegible]	[illegible] too sandy, small stones.
[illegible]	Severe: poor filter.	Severe: seepage.	Severe: too sandy.	Slight	[illegible] seepage, too sandy, small stones.
[illegible]	[illegible] cemented pan.	Severe: seepage, cemented pan.	Severe: cemented pan, too sandy.	Severe: cemented pan.	Poor: area reclaim, too sandy, small stones.
[illegible]	Severe: flooding, poor filter.	Severe: seepage, flooding.	Severe: flooding, too sandy.	Severe: flooding.	[illegible]
183: Caliza	Severe: poor filter.	Severe: seepage.	Severe: too sandy.	Slight	Poor: seepage, too sandy, small stones.
[illegible]	[illegible]	[illegible] flooding.	[illegible] too sandy.	[illegible]	[illegible] small stones.
187: Caliza	Severe: poor filter.	Severe: seepage.	Severe: too sandy.	Slight	Poor: seepage, too sandy, small stones.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
190 Dalian	Slight	Severe: seepage.	Slight	Slight	Poor: small stones.
[illegible] Dalian	[illegible] flooding.	Severe: seepage, flooding.	Moderate: flooding.	Moderate: flooding.	Poor small stones.
192*: Dalian	Moderate: flooding.	Severe: seepage, flooding.	Moderate: flooding.	Moderate: flooding.	Poor: small stones.
[illegible]	Severe: [illegible], excess gypsum.	Severe: [illegible], flooding, excess gypsum.	Moderate: [illegible].	[illegible]	Fair: [illegible].
200 Glencarb	Severe: percs slowly.	Severe: flooding.	Moderate: flooding.	Moderate: flooding.	Good.
205 Glencarb	Severe: flooding, wetness, excess gypsum.	Severe: flooding, wetness, excess gypsum.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: wetness.
[illegible]	Severe: wetness, percs slowly, excess gypsum.	Severe: flooding, wetness, excess gypsum.	Severe: wetness.	Severe: wetness.	Fair: wetness.
[illegible]	Severe: percs slowly, excess gypsum.	Severe: flooding, excess gypsum.	Moderate: flooding.	Moderate: flooding.	Good.
[illegible]	Severe: percs slowly.	Severe: flooding.	Severe: cemented pan.	Moderate: flooding, cemented pan.	Fair: area reclaim, thin layer.
[illegible]	Severe: cemented pan.	Severe: seepage, cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Poor: area [illegible], seepage, small stones.
252, 255 [illegible]	Moderate: flooding, percs slowly.	Severe: flooding.	Moderate: flooding.	Moderate: flooding.	Good.
[illegible]	Severe: poor filter.	Severe: seepage, flooding.	Severe: too sandy.	Moderate: flooding.	Poor: seepage, too sandy, small stones.
[illegible]*: [illegible]	Severe: poor filter.	Severe: seepage, flooding.	Severe: too sandy.	Moderate: flooding.	Poor: seepage, too sandy, small stones.
Jean	Severe: flooding, poor filter.	Severe: seepage, flooding.	Severe: flooding, too sandy.	Severe: flooding.	Poor: seepage, too sandy, small stones.
[illegible]	[illegible]	Severe: seepage, cemented pan, flooding.	Severe: cemented pan.	Severe: cemented pan.	Poor: area reclaim, seepage, small stones.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
263*:					
[illegible]	Severe: poor filter.	Severe: seepage, flooding.	Severe: too sandy.	Moderate: flooding.	Poor: seepage, too sandy, small stones.
Jean	Severe: flooding, poor filter.	Severe: seepage, flooding.	Severe: flooding, too sandy.	Severe: flooding.	Poor: seepage, too sandy, small stones.
264 [illegible]	Severe: poor filter.	Severe: seepage, flooding.	Severe: too sandy.	Moderate: flooding.	Poor: seepage, too sandy, small stones.
[illegible]	Severe: wetness, percs slowly.	Severe: flooding.	Severe: wetness, excess salt.	Moderate: flooding, wetness.	Good.
[illegible] Land	Severe: wetness, percs slowly.	Severe: flooding, wetness.	Severe: wetness, excess salt.	Severe: wetness.	Fair: wetness.
282 Land	Severe: wetness, percs slowly.	Severe: flooding, wetness.	Severe: wetness, excess salt.	Severe: wetness.	Fair: wetness.
300, 301 Las Vegas	Severe: cemented pan.	Severe: cemented pan, flooding.	Severe: cemented pan.	Severe: cemented pan.	Poor: area reclaim.
302*:					
Las Vegas	Severe: cemented pan.	Severe: cemented pan, flooding.	Severe: cemented pan.	Severe: cemented pan.	Poor: area reclaim.
McCarran	Severe: percs slowly, excess gypsum.	Severe: flooding, excess gypsum.	Moderate: flooding.	Moderate: flooding.	Good.
Grapevine	Moderate: flooding, percs slowly.	Severe: flooding.	Moderate: flooding.	Moderate: flooding.	[illegible]
305*:					
Las Vegas	Severe: cemented pan.	Severe: cemented pan, flooding.	Severe: cemented pan.	Severe: cemented pan.	Poor: area reclaim.
[illegible]	Severe: percs slowly.	Severe: flooding.	Moderate: flooding.	Moderate: flooding.	Poor: small stones.
307*:					
Las Vegas	Severe: cemented pan.	Severe: cemented pan, flooding.	Severe: cemented pan.	Severe: cemented pan.	Poor: area reclaim.
Skyhaven	Severe: cemented pan, percs slowly.	Severe: cemented pan, flooding.	Severe: cemented pan.	Severe: cemented pan.	Poor: area reclaim, small stones.
325, 326 McCarran	Severe: percs slowly, excess gypsum.	Severe: flooding, excess gypsum.	Moderate: flooding.	Moderate: flooding.	Good.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
341: Paradise	Severe: wetness.	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Fair: wetness.
360*: Rock outcrop.					
St. Thomas	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
380: Skyhaven	Severe: cemented pan, percs slowly.	Severe: cemented pan, flooding.	Severe: cemented pan.	Severe: cemented pan.	Poor: area reclaim, small stones.
390: Spring	Severe: percs slowly, excess gypsum.	Severe: flooding, excess gypsum.	Severe: excess salt.	Moderate: flooding.	Good.
400: Tencee	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Poor: area reclaim.
415: Aztec	Severe: percs slowly, excess gypsum.	Severe: excess gypsum.	Moderate: too sandy.	Slight	Poor: seepage, small stones.
417*: Aztec	Severe: percs slowly, slope, excess gypsum.	Severe: slope, excess gypsum.	Severe: slope.	Severe: slope.	Poor: seepage, small stones, slope.
Rock outcrop.					
418*: Aztec	Severe: percs slowly, excess gypsum.	Severe: slope, excess gypsum.	Moderate: slope, too sandy.	Moderate: slope.	Poor: seepage, small stones.
Nickel	Moderate: depth to rock, slope.	Severe: seepage, slope.	Severe: depth to rock.	Moderate: depth to rock, slope.	Poor: seepage, small stones.
Knob Hill	Severe: poor filter.	Severe: seepage.	Moderate: too sandy.	Slight	Poor: small stones.
419*: Aztec	Severe: percs slowly, excess gypsum.	Severe: slope, excess gypsum.	Moderate: slope, too sandy.	Moderate: slope.	Poor: seepage, small stones.
Bracken	Severe: slope, excess gypsum.	Severe: seepage, slope, excess gypsum.	Severe: depth to rock, slope.	Severe: slope.	Poor: slope.
430: Knob Hill	Severe: poor filter.	Severe: seepage.	Moderate: too sandy.	Slight	Poor: small stones.
440: Nickel	Moderate: depth to rock.	Severe: seepage.	Severe: depth to rock.	Moderate: depth to rock.	Poor: seepage, small stones.
450: Cave Variant	Severe: cemented pan, slope.	Severe: seepage, cemented pan, slope.	Severe: cemented pan, seepage, slope.	Severe: cemented pan, seepage, slope.	Poor: area reclaim, small stones, slope.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
[illegible] [illegible]	Severe: depth to rock, slope.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope.	Poor: area reclaim, large stones, slope.
[illegible] [illegible]	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope.	Poor: area reclaim, large stones, slope.
[illegible]*: [illegible]	Moderate: depth to rock, slope.	Severe: seepage, slope.	Severe: depth to rock.	Moderate: depth to rock, slope.	Poor: small stones.
[illegible]	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, seepage, small stones.
501 Canutio	Moderate: large stones.	Severe: seepage.	Moderate: large stones.	Slight	Poor: small stones.
502*: Canutio	Moderate: large stones.	Severe: seepage.	Moderate: large stones.	Slight	Poor: small stones.
[illegible]ave	Severe: cemented pan.	Severe: seepage, cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Poor: area reclaim, small stones.
[illegible]*: [illegible]	Severe: slope.	Severe: seepage, slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: small stones, slope.
[illegible]	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, seepage, small stones.
[illegible]*: [illegible]	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, seepage, small stones.
Rock outcrop.					
[illegible] Weiser	Slight	Severe: seepage.	Slight	Slight	Poor: small stones.
[illegible]*: Weiser	Slight	Severe: seepage.	Slight	Slight	Poor: small stones.
[illegible]	Severe: percs slowly, excess gypsum.	Severe: excess gypsum.	Moderate: too sandy.	Slight	Poor: seepage, small stones.
545*: Weiser	Slight	Severe: seepage.	Slight	Slight	Poor: small stones.
Goodsprings	Severe: cemented pan.	Severe: seepage, cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Poor: area reclaim, seepage, small stones.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
600*. Slickens					
605*. Dumps					
610*. Pits					
615*. Urban land					
630*. Badlands					
635*, 640*. Rock outcrop					
645*. Pits					

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--CONSTRUCTION MATERIALS

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," "poor," "probable," and "improbable." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
105*:				
McCullough	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, thin layer.
Jean	Fair: large stones.	Probable	Probable	Poor: small stones, area reclaim.
Bluepoint	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy.
107 Arizo	Poor: large stones.	Probable	Probable	Poor: small stones, area reclaim.
112 Arizo	Fair: large stones.	Probable	Probable	Poor: small stones, area reclaim.
113 Arizo	Good	Improbable: thin layer.	Improbable: thin layer.	Poor: small stones.
117 Arizo	Fair: large stones.	Probable	Probable	Poor: small stones, area reclaim.
120 Bluepoint	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
127, 128 Bluepoint	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy.
129 Bluepoint	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy.
130*:				
Bracken	Fair: area reclaim, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Destazo	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
132 Bracken	Fair: area reclaim, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
133*:				
Bracken	Fair: area reclaim, thin layer, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Rock outcrop.				
134 Bracken	Fair: area reclaim, thin layer, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
140 Casaga	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, excess salt.
150 Cave	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
151 Cave	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim.
152, 155 Cave	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
160 Destazo	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
181*: Caliza	Good	Probable	Probable	Poor: small stones, area reclaim.
Pittman	Poor: area reclaim.	Probable	Probable	Poor: small stones, area reclaim.
182*: Caliza	Good	Probable	Probable	Poor: small stones, area reclaim.
Pittman	Poor: area reclaim.	Probable	Probable	Poor: small stones, area reclaim.
Arizo	Fair: large stones.	Probable	Probable	Poor: small stones, area reclaim.
183, 184, 187 Caliza	Good	Probable	Probable	Poor: small stones, area reclaim.
190, 191 Dalian	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
192*: Dalian	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
McCullough	Good	Improbable: small stones.	Probable	Poor: area reclaim.
200 Glencarb	Fair: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Good.
206, 222 Glencarb	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
236 Glencarb	Fair: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: excess salt.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
237 Glencarb	Fair: area reclaim, low strength, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
240 Goodsprings	Poor: area reclaim.	Improbable: small stones.	Probable	Poor: area reclaim, small stones.
252 Grapevine	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
255 Grapevine	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy, small stones.
260 Jean	Fair: large stones.	Probable	Probable	Poor: small stones, area reclaim.
262*:				
Jean	Fair: large stones.	Probable	Probable	Poor: small stones, area reclaim.
Jean	Fair: large stones.	Probable	Probable	Poor: small stones, area reclaim.
Goodsprings	Poor: area reclaim.	Improbable: small stones.	Probable	Poor: area reclaim, small stones.
263*:				
Jean	Fair: large stones.	Probable	Probable	Poor: small stones, area reclaim.
Jean	Fair: large stones.	Probable	Probable	Poor: small stones, area reclaim.
264 Jean	Fair: large stones.	Probable	Probable	Poor: small stones, area reclaim.
2[illegible] Land	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess salt.
[illegible] Land	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess salt.
2[illegible]2 Land	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess salt.
[illegible] Las Vegas	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
302*:				
Las Vegas	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
McCarran	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: excess salt.
Grapevine	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
[illegible]*: Las Vegas	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	[illegible] area reclaim, small stones.
[illegible]	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
[illegible]*: Las Vegas	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
Skyhaven	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
[illegible]2 McCarran	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: excess salt.
[illegible] McCarran	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
341 Paradise	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: excess salt.
360*: Rock outcrop.				
St. Thomas	Poor: area reclaim, large stones.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, small stones, slope.
380 Skyhaven	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
390 Spring	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: excess salt.
400 Tencee	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
[illegible] Aztec	[illegible]	Improbable: small stones.	Probable	Poor: small stones, area reclaim.
[illegible]*: Aztec	Fair: slope.	Improbable: small stones.	Probable	Poor: small stones, area reclaim, slope.
Rock outcrop.				
418*: Aztec	Good	Improbable: small stones.	Probable	[illegible] small stones, area reclaim.
[illegible]	Fair: area reclaim, thin layer.	Improbable: thin layer.	Improbable: thin layer.	Poor: small stones, area reclaim.
[illegible]	[illegible]	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
[illegible]*: Aztec	Good	Improbable: small stones.	Probable	Poor: small stones, area reclaim.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
419*: Bracken	Fair: area reclaim, thin layer, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
430 Knob Hill	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
440 Nickel	Fair: area reclaim, thin layer.	Improbable: thin layer.	Improbable: thin layer.	Poor: small stones, area reclaim.
450 Cave Variant	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
481 Hobog	Poor: area reclaim, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, large stones, slope.
484 Hobog	Poor: area reclaim, large stones, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, large stones, slope.
500*: Canutio	Fair: area reclaim, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
Akela	Poor: area reclaim.	Improbable: thin layer.	Improbable: thin layer.	Poor: area reclaim, small stones.
501 Canutio	Fair: large stones.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
502*: Canutio	Fair: large stones.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
Cave	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
505*: Canutio	Fair: area reclaim, thin layer, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Akela	Poor: area reclaim, slope.	Improbable: thin layer.	Improbable: thin layer.	Poor: area reclaim, small stones, slope.
510*: Akela	Poor: area reclaim, slope.	Improbable: thin layer.	Improbable: thin layer.	Poor: area reclaim, small stones, slope.
Rock outcrop.				

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
540: Weiser	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
542*: Weiser	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
Aztec	Good	Improbable: small stones.	Probable	Poor: small stones, area reclaim.
545*: Weiser	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
Goodsprings	Poor: area reclaim.	Improbable: small stones.	Probable	Poor: area reclaim, small stones.
600*. Slickens				
605*. Dumps				
610*. Pits				
615*. Urban land				
630*. Badlands				
635*, 640*. Rock outcrop				
645*. Pits				

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--WATER MANAGEMENT

[[illegible] terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated]

Soil name and map symbol	Limitations for--		Features affecting--	
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation
[illegible]*: [illegible]	Severe: seepage, excess gypsum.	Severe: piping, excess gypsum.	Deep to water	Soil blowing.
[illegible]	Severe: seepage.	Severe: seepage.	Deep to water	Large stones, droughty, fast intake.
Bluepoint	Severe: seepage.	Severe: piping.	Deep to water	Droughty, fast intake, soil blowing.
[illegible] Arizo	Severe: seepage.	Severe: seepage, large stones.	Deep to water	Large stones, droughty.
[illegible] Arizo	Severe: seepage.	Severe: seepage.	Deep to water	Large stones, droughty, fast intake.
[illegible] Arizo	Severe: seepage.	Severe: seepage.	Deep to water	Droughty, slope.
117 Arizo	Severe: seepage.	Severe: seepage.	Deep to water	Large stones, droughty, slope.
[illegible] Bluepoint	Severe: seepage.	Severe: piping.	Deep to water	Droughty, soil blowing.
127, 128 Bluepoint	Severe: seepage.	Severe: piping.	Deep to water	Droughty, fast intake, soil blowing.
[illegible] Bluepoint	Severe: seepage, slope.	Severe: piping.	Deep to water	Droughty, fast intake, soil blowing.
[illegible]*: Bracken	Severe: seepage, excess gypsum.	Severe: seepage, excess gypsum.	Deep to water	Droughty, slope.
Destazo	Severe: slope.	Moderate: large stones.	Deep to water	Droughty, slope.
132 Bracken	Severe: seepage, excess gypsum.	Severe: seepage, excess gypsum.	Deep to water	Droughty, slope.
133*: Bracken	Severe: seepage, slope, excess gypsum.	Severe: seepage, excess gypsum.	Deep to water	Droughty.
Rock outcrop.				
134 Bracken	Severe: seepage, slope, excess gypsum.	Severe: seepage, excess gypsum.	Deep to water	Droughty, slope.

See footnote at end of table.

TABLE 12.--Water Management--continued

Soil name and map symbol	Limitations for--		Features affecting--	
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation
[illegible] Tesage	Moderate: seepage, slope.	Severe: excess sodium.	Deep to water	Percs slowly, slope, excess sodium.
[illegible] Cave	Severe: cemented pan.	Severe: large stones.	Deep to water	Large stones, droughty, cemented pan.
[illegible] Cave	Severe: cemented pan.	Severe: thin layer.	Deep to water	Droughty, fast intake, soil blowing.
[illegible] Cave	Severe: seepage, cemented pan.	Severe: seepage.	Deep to water	Cemented pan.
[illegible] Cave	Severe: seepage, cemented pan, slope.	Severe: seepage.	Deep to water	Cemented pan, slope.
[illegible] Destazo	Moderate: seepage.	Moderate: large stones.	Deep to water	Droughty.
181*:				
Caliza	Severe: seepage.	Severe: seepage.	Deep to water	Droughty, slope.
Pittman	Severe: seepage.	Severe: seepage.	Deep to water	Large stones, droughty, cemented pan.
[illegible]*:				
Caliza	Severe: seepage.	Severe: seepage.	Deep to water	Droughty, slope.
Pittman	Severe: seepage.	Severe: seepage.	Deep to water	Large stones, droughty, cemented pan.
[illegible]	Severe: seepage.	Severe: seepage.	Deep to water	Large stones, droughty, fast intake.
183 Caliza	Severe: seepage.	Severe: seepage.	Deep to water	Droughty, fast intake, slope.
184, 187 Caliza	Severe: seepage.	Severe: seepage.	Deep to water	Droughty, slope.
190, 191 Dalian	Severe: seepage.	Severe: seepage.	Deep to water	Droughty, slope.
192*:				
Dalian	Severe: seepage.	Severe: seepage.	Deep to water	Droughty.
McCullough	Severe: seepage, excess gypsum.	Severe: piping, excess gypsum.	Deep to water	Droughty.
200 Glencarb	Slight	Severe: piping.	Deep to water	Favorable.
206 Glencarb	Severe: excess gypsum.	Severe: piping, excess gypsum.	Deep to water	Droughty, erodes easily, flooding.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Co[illegible]

Soil name and map symbol	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation
[illegible]	Severe, excess gypsum.	Severe: piping, excess gypsum.	Deep to water	Droughty, erodes easily.
[illegible] Glencarb	Severe: excess gypsum.	Severe: piping, excess gypsum.	Deep to water	Excess salt.
237 Glencarb	Moderate: cemented pan.	Severe: piping.	Deep to water	Soil blowing, excess salt.
240 Goodsprings	Severe: cemented pan.	Severe: seepage.	Deep to water	Droughty, cemented pan, slope.
252 Grapevine	Moderate: seepage.	Severe: piping.	Deep to water	Favorable.
255 [illegible]	Moderate: [illegible], slope.	Severe: [illegible]	Deep to water	Fast intake, [illegible]
[illegible]	Severe: seepage.	Severe: seepage.	Deep to water	Large stones, droughty, fast intake.
262*:				
Jean	Severe: seepage.	Severe: seepage.	Deep to water	Large stones, droughty, fast intake.
Jean	Severe: seepage.	Severe: seepage.	Deep to water	Large stones, droughty, fast intake.
[illegible]	[illegible]	Severe. seepage.	Deep to water	Droughty, cemented pan, slope.
263*:				
Jean	Severe: seepage.	Severe: seepage.	Deep to water	Large stones, droughty, fast intake.
Jean	Severe: seepage.	Severe: seepage.	Deep to water	Large stones, droughty, fast intake.
264 Jean	Severe: seepage.	Severe: seepage.	Deep to water	Large stones, droughty, fast intake.
[illegible]	[illegible]	Severe: excess salt.	Deep to water	Excess salt.
[illegible]	[illegible]	Severe. wetness, excess salt.	Excess salt	Wetness, soil blowing, excess salt.
282 Land	Slight	Severe excess salt.	Deep to water	Erodes easily, excess salt.
300, 301 Las Vegas	Severe: cemented pan.	Severe: thin layer.	Deep to water	Cemented pan.
302* Las Vegas	Severe: cemented pan.	Severe thin layer.	Deep to water	Cemented pan.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--	
	Pond reservoir areas	Embankments, dikes and levees	Drainage	Irrigation
302*:				
McCarran	Severe: excess gypsum.	Severe: excess gypsum.	Deep to water	Soil blowing, excess salt.
Grapevine	Moderate: seepage.	Severe: piping.	Deep to water	Favorable.
[illegible]*:				
Las Vegas	Severe: cemented pan.	Severe: thin layer.	Deep to water	Cemented pan.
Destazo	Slight	Slight	Deep to water	Droughty, soil blowing.
307*:				
Las Vegas	Severe: cemented pan.	Severe: thin layer.	Deep to water	Cemented pan.
Skyhaven	Moderate: cemented pan.	Moderate: thin layer, piping, excess salt.	Deep to water	Cemented pan, excess salt.
[illegible]25 McCarran	Severe: excess gypsum.	Severe: excess gypsum.	Deep to water	Soil blowing, excess salt.
326 McCarran	Severe: excess gypsum, slope.	Severe: piping, excess gypsum.	Deep to water	Slope, excess salt.
3[illegible]1 Paradise	Moderate: seepage.	Severe: piping.	Deep to water	Erodes easily, excess salt.
360*:				
Rock outcrop.				
St. Thomas	Severe: depth to rock, slope.	Severe: seepage, large stones.	Deep to water	Large stones, droughty, depth to rock.
380 Skyhaven	Moderate: cemented pan.	Moderate: thin layer, piping, excess salt.	Deep to water	Cemented pan, excess salt.
390 Spring	Severe: excess gypsum.	Severe: excess salt, excess gypsum.	Deep to water	Percs slowly, excess salt.
400 Tencee	Severe: cemented pan.	Severe: thin layer.	Deep to water	Droughty, cemented pan, slope.
4[illegible]5 Aztec	Severe: excess gypsum.	Severe: seepage, excess gypsum.	Deep to water	Droughty, slope.
4[illegible]7*:				
Aztec	Severe: slope, excess gypsum.	Severe: seepage, excess gypsum.	Deep to water	Droughty, slope.
Rock outcrop.				
418*:				
Aztec	Severe: slope, excess gypsum.	Severe: seepage, excess gypsum.	Deep to water	Droughty, slope.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Limitations for-- Embankments, dikes, and levees	Features affecting-- Drainage	Features affecting-- Irrigation
418*:				
Nickel	Severe: seepage, slope.	Severe: seepage.	Deep to water	Droughty, slope.
Knob Hill	Severe: seepage.	Severe: seepage.	Deep to water	Droughty, fast intake, soil blowing.
419*:				
Aztec	Severe: slope, excess gypsum.	Severe: seepage, excess gypsum.	Deep to water	Droughty, slope.
Bracken	Severe: seepage, slope, excess gypsum.	Severe: seepage, excess gypsum.	Deep to water	Droughty, slope.
430 [illegible]	Severe: seepage.	Severe: seepage.	Deep to water	Droughty, fast intake, soil blowing.
4[illegible] [illegible]ickel	Severe: seepage.	Severe: seepage.	Deep to water	Droughty, slope.
4[illegible] [illegible]	Severe: seepage, cemented pan, slope.	Severe: seepage.	Deep to water	Droughty, cemented pan, slope.
4[illegible] [illegible]	Severe: depth to rock, [illegible].	Severe: large stones.	Deep to water	Large stones, droughty, fast intake.
4[illegible] [illegible]	[illegible] [illegible] rock, [illegible]	Severe: large stones.	Deep to water	Large stones, droughty, depth to rock.
[illegible]*:				
Canutio	Severe: seepage, slope.	Severe: seepage.	Deep to water	Droughty, slope.
Akela	Severe: [illegible] rock.	Severe: seepage.	Deep to water	Droughty, depth to rock, slope.
501 Canutio	Severe: seepage.	Severe: seepage.	Deep to water	Large stones, droughty, soil blowing.
50[illegible]*:				
[illegible]	Severe: seepage.	Severe: seepage.	Deep to water	Large stones, droughty, soil blowing.
Cave	Severe: seepage, cemented pan.	Severe: seepage.	Deep to water	Cemented pan, slope.
505*:				
Canutio	Severe: seepage, slope.	Severe: seepage.	Deep to water	Droughty, slope.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--	
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation
5[illegible]5*: Akela	Severe: depth to rock, slope.	Severe: seepage.	Deep to water	Droughty, depth to rock, slope.
5[illegible]0*: Akela	Severe: depth to rock, slope.	Severe: seepage.	Deep to water	Droughty, depth to rock, slope.
Rock outcrop.				
540: Weiser	Severe: seepage.	Severe: seepage.	Deep to water	Droughty, slope.
542*: Weiser	Severe: seepage.	Severe: seepage.	Deep to water	Droughty, slope.
Aztec	Severe: excess gypsum.	Severe: seepage, excess gypsum.	Deep to water	Droughty, slope.
545*: Weiser	Severe: seepage.	Severe: seepage.	Deep to water	Droughty, slope.
Goodsprings	Severe: cemented pan.	Severe: seepage.	Deep to water	Droughty, cemented pan, slope.
600*. Slickens				
605*. Dumps				
610*. Pits				
615*. Urban land				
6[illegible]*. [illegible]				
635*, 640*. Rock outcrop				
645*. Pits				

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--ENGINEERING INDEX PROPERTIES

[The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated]

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
105*: McCullough----------	0-2	Fine sandy loam	SM	A-4	0	95-100	95-100	65-80	40-50	---	NP
	2-15	Stratified sandy loam to loam.	SM	A-4, A-2	0	90-100	90-100	55-65	30-40	15-25	NP-5
	15-60	Stratified coarse sand to loamy fine sand.	SM	A-1, A-2	0	80-100	75-95	40-60	[illegible]	---	NP
Jean-------------	0-[illegible]	Loamy fine sand	SM	A-2	0	90-100	75-100	65-90	25-35	---	NP
	[illegible]-15	Loamy fine sand	SM	A-2	0	90-100	75-100	65-90	25-35	---	NP
	15-60	Stratified extremely gravelly sand to very gravelly loamy fine sand	GP, GP-GM	A-1	[illegible]	25-45	10-35	5-30	[illegible]	---	NP
Bluepoint--------	0-2	Loamy fine sand	SM	A-2, A-4	0	[illegible]	[illegible]	75-85	25-45	---	NP
	2-60	Loamy fine sand, loamy sand, fine sand.	SM	A-2, A-4	0	[illegible]	[illegible]	65-85	25-45	---	NP
110---------------- Arizo	0-4	Extremely stony loam	GM	A-2, A-4	[illegible]-75	[illegible]	[illegible]	[illegible]	[illegible]	25-35	NP-10
	4-60	Stratified extremely stony coarse sand to very gravelly sandy loam.	GP-GM, GP	A-1	15-50	45-55	[illegible]	[illegible]	[illegible]	---	NP
112------------ Arizo	0-2	Very gravelly loamy sand.	GP-GM, GM	A-1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	---	NP
	2-60	Stratified cobbly coarse sand to extremely gravelly sandy loam.	GP-GM, GP	A-1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	---	NP
113------------- Arizo	0-2	Very gravelly fine sandy loam.	GM	A-1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	---	NP
	2-40	Very gravelly loamy sand, extremely gravelly loamy sand.	GP-GM	A-1	[illegible]	40-50	[illegible]	15-20	5-10	---	NP
	40-60	Gypsiferous material.	---	---	---	---	---	---	---	---	NP
117------------ Arizo	0-6	Very gravelly fine sandy loam.	GM	A-1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	NP-5
	6-60	Stratified cobbly coarse sand to extremely gravelly loamy sand.	GP-GM, GP	A-1	5-35	25-55	[illegible]	[illegible]	[illegible]	---	NP
120------------- Bluepoint	0-4	Fine sandy loam	SM	A-4	0	[illegible]	90-100	[illegible]	[illegible]	---	NP
	4-60	Stratified loamy fine sand to fine sand.	SM	A-2	0	[illegible]	[illegible]	[illegible]	20-35	---	NP

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
127------------- Bluepoint	0-9	Loamy fine sand	SM	A-2, A-4	0	100	100	75-85	25-45	---	NP
	9-24	Stratified fine sand to gravelly loamy fine sand.	SM	A-2	0	70-100	60-90	55-85	[illegible]	---	NP
	24-41	Loamy fine sand, loamy sand, fine sand.	SM	A-2, A-4	0	100	100	65-85	25-45	---	NP
	41-60	Stratified loamy sand to very fine sandy loam.	SM, ML	A-2, A-4	0	100	100	50-90	30-60	---	NP
128--------------- Bluepoint	0-9	Gravelly loamy fine sand.	SM	A-2	0	70-90	50-75	50-65	10-25	---	NP
	9-24	Stratified fine sand to gravelly loamy fine sand.	SM	A-2	0	70-100	60-90	55-85	10-30	---	NP
	24-41	Loamy fine sand, loamy sand, fine sand.	SM	A-2, A-4	0	100	100	65-85	25-45	---	NP
	41-60	Stratified loamy sand to very fine sandy loam.	SM, ML	A-2, A-4	0	100	100	50-90	30-60	---	NP
129-------- Bluepoint	0-2	Loamy fine sand	SM	A-2, A-4	0	100	100	75-85	25-45	---	NP
	2-60	Loamy fine sand, loamy sand, fine sand.	SM	A-2, A-4	0	100	100	65-85	25-45	---	NP
130* Bracken----------	0-1	Very cobbly fine sandy loam.	GM, SM	A-1	30-55	45-60	40-55	30-45	10-25	---	NP
	1-60	Gypsiferous material.	---	---	---	---	---		---	---	---
Destazo----------	0-10	Cobbly fine sandy loam.	SM	A-2	25-35	85-95	80-90	55-70	25-35	20-30	NP-5
	10-31	Very gravelly sandy clay loam, very gravelly clay loam.	GM-GC, GC	A-1, A-2	5-10	35-55	30-50	15-30	10-25	25-40	5-15
	31-60	Gravelly sandy loam.	SM	A-1, A-2	0-5	60-70	55-65	45-55	20-30	25-30	NP-5
132----------- Bracken	0-5	Very gravelly fine sandy loam.	GM	A-1	0-5	30-50	25-45	20-40	10-25	---	NP
	5-60	Gypsiferous material.	---	---	---	---	---	---	---	---	---
133* Bracken----------	0-1	Very gravelly sandy loam.	GM	A-1	0-5	30-50	25-45	20-40	10-25	---	NP
	1-60	Gypsiferous material.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
134--------------- Bracken	0-1	Very gravelly fine sandy loam.		A-1	0-5	30-50	25-45	20-40	10-25	---	NP
	1-60	Gypsiferous material.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
40--------------- Casaga	0-1	Very gravelly sandy clay loam.	GC	A-2	0-5	30-55	25-50	15-30	10-20	25-35	10-15
	[illegible]	Clay loam--------	CL	A-6	0-5	90-100	85-100	80-95	65-75	35-40	15-20
	[illegible]	Very gravelly clay loam, gravelly clay loam.	GC	A-6, A-2	0	30-60	25-55	25-50	20-40	35-40	15-20
	[illegible]-60	Stratified very gravelly sandy loam to gravelly clay loam.	GM, GM-GC	A-1, A-2	0-5	40-60	35-55	25-35	10-20	15-25	NP-10
150--------------- Cave	0-6	Very stony sandy loam.	SM	A-1, A-2	[illegible]	70-85	55-75	40-55	[illegible]	15-20	NP-5
	6-60	Indurated--------	---	---	---	---	---	---	---	---	
151--------------- Cave	0-5	Loamy fine sand	SM	A-2	0	95-100	95-100	80-90	15-20	---	NP
	5-11	Gravelly fine sandy loam.	SM	A-2	0	70-80	50-60	45-55	25-35	20-25	NP-5
	11-60	Indurated--------	---	---	---	---	---	---	---	---	---
152--------------- Cave	0-12	Gravelly fine sandy loam.	SM	A-2, A-4	0-5	70-90	60-75	45-65	25-40	20-25	NP-5
	12-36	Indurated--------	---	---	---	---	---	---	---	---	---
	36-60	Gravelly loamy sand, very gravelly sandy loam.	GM, SM	A-1, A-2	0-5	35-75	30-60	20-35	10-30	---	NP
155--------------- Cave	0-15	Gravelly fine sandy loam.	SM	A-2, A-4	0-5	70-90	60-75	45-65	25-40	20-25	NP-5
	15-60	Indurated--------	---	---	---	---	---	---	---	---	---
160--------------- Destazo	0-11	Cobbly fine sandy loam.	SM	A-2	25-35	85-95	80-90	55-70	25-35	20-30	NP-5
	11-40	Very gravelly sandy clay loam, very gravelly clay loam.	GM-GC, GC	A-1, A-2	5-10	35-55	30-50	15-30	10-25	25-40	5-15
	40-60	Gravelly sandy loam	SM	A-1, A-2	[illegible]	[illegible]	55-65	45-55	20-30	25-30	NP-5
161*: Caliza------------	0-2	Extremely stony fine sandy loam.	GM	A-1	30-45	40-45	30-35	20-30	10-20	---	NP
	2-14	Very gravelly sandy loam.	GM	A-1	0-10	40-45	30-45	20-30	10-20	---	NP
	14-60	Stratified very gravelly loamy sand to extremely gravelly coarse sand	GP-GM	A-1	0-10	35-45	25-40	10-20	5-10	---	NP
Pittman-----------	0-2	Extremely stony fine sandy loam.	GM	A-1	30-45	40-60	25-55	20-45	15-25	15-25	NP-5
	2-23	Stratified gravelly loam to extremely gravelly coarse sand	GM	A-1	10-30	40-60	35-55	20-35	15-25	15-20	NP-5
	23-32	Indurated--------	---	---	---	---	---	---	---	---	---
	32-50	Cemented---------	---	---	---	---	---	---	---	---	---
	50-60	Very gravelly sand, extremely gravelly sand.	GP	A-1	0	[illegible]	15-30	[illegible]	[illegible]	---	NP

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
182*:											
Caliza	0-2	Extremely cobbly fine sandy loam	GM	A-1	30-45	40-45	30-35	20-40	10-20	---	NP
	2-14	Very gravelly sandy loam	GM	A-1	0-10	40-45	30-45	20-30	10-20	---	NP
	14-60	Stratified very gravelly loamy sand to extremely gravelly coarse sand.	GP-GM	A-1	0-10	35-45	25-40	10-20	5-10	---	NP
Pittman	0-2	Extremely cobbly fine sandy loam.	GM	A-1	40-50	30-45	25-40	20-35	10-20	15-25	NP-5
	2-23	Stratified gravelly loam to extremely gravelly coarse sand.	GM	A-1	10-30	40-65	35-55	20-35	15-25	15-20	NP-5
	23-32	Indurated	---	---	---	---	---	---	---	---	---
	32-50	Cemented	---	---	---	---	---	---	---	---	---
	50-60	Very gravelly sand, extremely gravelly sand.	[illegible]	A-1	0	20-35	15-30	10-20	0-5	---	NP
Arizo	0-8	Very gravelly loamy sand.	GP-GM, GM	A-1	0-5	45-55	35-45	15-30	5-15		NP
	8-60	Stratified cobbly coarse sand to extremely gravelly sandy loam.	GP-GM, GP	A-1	10-35	35-55	20-40	10-30	0-10	---	NP
183 Caliza	0-3	Very cobbly loamy sand.	GM	A-1	35-45	50-60	45-55	15-25	10-20	---	NP
	3-60	Stratified very gravelly loamy sand to extremely gravelly coarse sand.	GP-GM	A-1	0-10	35-45	25-40	10-20	5-10	---	NP
184 Caliza	0-3	Very gravelly sandy loam.	GM	A-1	0-5	45-55	35-45	25-35	10-20	---	NP
	3-16	Very gravelly sandy loam, very cobbly sandy loam	GM, SM	A-1, A-2	10-30	50-70	40-60	30-45	15-30	---	NP
	16-60	Stratified very gravelly coarse sand to loamy sand.	SP, SP-SM, SM	A-1	0-5	50-65	40-55	10-25	0-15	---	NP
187 Caliza	0-2	Extremely cobbly fine sandy loam.	GM	A-1	40-50	40-50	25-40	20-35	10-20	---	NP
	2-14	Very gravelly sandy loam.	GM	A-1	0-10	40-45	30-45	20-30	10-20	---	NP
	14-60	Stratified very gravelly loamy sand to extremely gravelly coarse sand.	GP-GM	A-1	0-10	35-45	25-40	10-20	5-10	---	NP

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag-ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas-ticity index
	In				Pct					Pct	
[illegible]------- Dalian	0-4	Very gravelly fine sandy loam.	GM	A-1	0	[illegible]0-55	25-50	20-40	10-25	---	NP
	4-6[illegible]	Very gravelly sandy loam, extremely gravelly fine sandy loam.	[illegible], GP-GM, GP	A-1	5-1[illegible]	20-60	10-50	5-40	0-25	---	NP
191------- Dalian	0-5	Very cobbly fine sandy loam.	[illegible]M	A-[illegible], A-2	35-50	55-65	50-60	40-55	20-30	---	NP
	5-60	Very gravelly sandy loam, extremely gravelly fine sandy loam.	GM, [illegible]P-GM	A-1	5-1[illegible]	[illegible]	15-50	[illegible]-40	5-25	---	NP
192*:											
[illegible]-------	0-5	Very gravelly fine sandy loam.	GM	A-[illegible]	0	[illegible]0-55	25-50	20-40	[illegible]0-25	---	NP
	5-60	Very gravelly sandy loam, extremely gravelly fine sandy loam.	GM, GP-GM	A-1	5-1[illegible]	20-60	15-5[illegible]	1[illegible]-40	5-25	---	NP
McCullough-------	[illegible]	Very gravelly very fine sandy loam.	[illegible]M	A-1	5-10	35-[illegible]5	30-4[illegible]	25-40	15-25	20-25	NP-5
	[illegible]-30	Stratified loam to sandy loam.	SM	A-4, A-2	0	95-100	90-100	55-65	30-40	15-25	NP-5
	30-[illegible]	Stratified coarse sand to loamy fine sand	SM	A-1, A-2	0	80-100	75-95	[illegible]-60	1[illegible]-30	---	NP
	[illegible]-60	Extremely gravelly loamy sand.	GP-GM	A-1	5-10	20-[illegible]	15-25	10-15	5-10	---	NP
200------- Glencarb	0-6	Silt loam-------	ML, [illegible]-ML	A-4	0	[illegible]	[illegible]	90-100	70-90	20-30	NP-[illegible]
	6-60	Stratified silty clay loam to very fine sandy loam.	[illegible], [illegible]-ML	A-4, A-6	0	[illegible]	100	95-100	75-85	25-35	[illegible]-15
206------- Glencarb	0-8	Silt loam-------	ML, CL-ML	A-4	[illegible]	100	100	95-100	75-90	20-30	NP-[illegible]
	8-60	Silt loam, silty clay loam.	ML, CL	A-4, A-6, A-7	[illegible]	100	100	95-100	80-95	30-45	5-20
222------- Glencarb	0-6	Silty clay loam	C[illegible]	A-6	[illegible]	100	100	95-100	85-95	35-[illegible]	1[illegible]-20
	6-60	Silt loam, silty clay loam	[illegible], CL	A-4, A-6, A-7	0	100	[illegible]	95-100	80-95	30-45	[illegible]-20
236------- Glencarb	0-6	Very fine sandy loam.	ML, [illegible]-ML	A-4	0	100	100	85-95	55-65	20-30	NP
	6-60	Stratified clay loam to very fine sandy loam.	[illegible]-ML, [illegible]	A-4, A-6	0	[illegible]	100	95-100	75-85	2[illegible]-3[illegible]	5-15
[illegible]7------- Glencarb	[illegible]-6	Very fine sandy loam.	ML, CL-ML	A-4	0	[illegible]	[illegible]	85-100	55-65	20-3[illegible]	NP-10
	6-42	Stratified silty clay loam to silt loam	[illegible]-ML	A-4, A-6	[illegible]	1[illegible]	1[illegible]	95-100	75-85	25-35	5-15
	42-60	Cemented-------	---	---	---	---	---	---	---	---	---

See footnote at end of table

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
240----------------- Goodsprings	0-5	Gravelly fine sandy loam.	SM, GM	A-2	0	55-80	50-75	40-60	25-35	---	NP
	5-15	Gravelly fine sandy loam.	SM, GM	A-2	0-10	60-75	55-70	45-55	25-35	---	NP
	15-52	Cemented----------	---	---	---	---	---	---	---	---	---
	52-60	Extremely gravelly loamy fine sand, extremely gravelly sandy loam	GP, GP-GM	A-1	10-15	15-30	10-25	5-20	0-10	---	NP
252----------------- Grapevine	0-5	Very fine sandy loam.	ML	A-4	0	100	100	85-95	60-75	15-25	NP-5
	5-69	Stratified fine sandy loam to clay loam.	SM, SM-SC	A-4	0	80-95	75-90	60-75	35-45	15-25	NP-10
255----------------- Grapevine	0-10	Loamy fine sand	SM	A-2, A-4	0	100	100	75-90	25-40	---	NP
	10-60	Stratified fine sandy loam to clay loam	SM, SM-SC	A-4	0	80-95	75-90	60-75	35-45	15-25	NP-10
260----------------- Jean	0-1	Gravelly loamy fine sand.	SM	A-2	0	75-85	65-75	55-70	15-25	---	NP
	1-18	Loamy fine sand	SM	A-2	0	90-100	75-100	65-90	25-35	---	NP
	18-60	Stratified extremely gravelly sand to very gravelly loamy fine sand	GP, GP-GM	A-1	10-40	25-45	10-35	5-30	0-10	---	NP
262*:											
Jean-------------	0-2	Gravelly loamy fine sand.	SM	A-2	0	75-85	65-75	55-70	15-25	---	NP
	2-12	Loamy fine sand	SM	A-2	0	90-100	75-100	65-90	25-35	---	NP
	12-48	Stratified extremely gravelly sand to very gravelly loamy fine sand.	GP, GP-GM	A-1	10-40	25-45	10-35	5-30	0-10	---	NP
Jean-------------	0-1	Very gravelly loamy fine sand	GP-GM, GM, SM, SP-SM	A-1	[illegible]	[illegible]	25-50	20-40	5-15	---	NP
	1-11	Loamy fine sand	SM	A-2		90-100	75-100	65-90	25-35	---	NP
	11-60	Stratified extremely gravelly fine sand to very gravelly loamy fine sand.	GP, GP-GM	A-1	10-40	25-45	10-35	5-30	0-10	---	NP
Goodsprings------	0-5	Gravelly fine sandy loam.	SM, GM	A-2	0	55-80	50-75	40-60	25-35	---	NP
	5-15	Gravelly fine sandy loam.	SM, GM	A-2	0-10	60-75	55-70	45-55	25-35	---	NP
	15-52	Cemented----------	---	---	---	---	---	---	---	---	---
	52-60	Extremely gravelly loamy fine sand, extremely gravelly sandy loam.	GP, GP-GM	A-1	10-15	15-30	10-25	5-20	0-10	---	NP

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
263*:											
Jean	0-1	Gravelly loamy fine sand.	SM	A-2	0	75-85	65-75	55-70	15-25	---	NP
	1-11	Loamy fine sand	SM	A-2	0	90-100	75-100	65-90	25-35	---	NP
	11-60	Stratified extremely gravelly sand to very gravelly loamy fine sand.	GP, GP-GM	A-1	10-40	25-45	10-35	5-30	0-10	---	NP
Jean	0-1	Very gravelly loamy fine sand.	GP-GM, GM, SM, SP-SM	A-1	0-30	40-60	25-50	20-40	5-15	---	NP
	1-11	Loamy fine sand	SM	A-2	0	90-100	75-100	65-90	25-35	---	NP
	11-60	Stratified extremely gravelly fine sand to very gravelly loamy fine sand.	GP, GP-GM	A-1	10-40	25-45	10-35	5-30	0-10	---	NP
264 Jean	0-1	Very gravelly loamy fine sand.	GP-GM, GM	A-1	0-30	40-60	25-50	20-40	5-15	---	NP
	1-18	Loamy fine sand	SM	A-2	0	90-100	75-100	65-90	25-35	---	NP
	18-60	Stratified extremely gravelly sand to very gravelly loamy fine sand.	GP, GP-GM	A-1	10-40	25-45	10-35	5-30	0-10	---	NP
270 Land	0-5	Silt loam	[illegible]	A-4, A-6	0	100	100	90-100	70-90	25-35	5-15
	5-60	Stratified silty clay to silt loam.	CL	A-6	0	100	100	95-100	85-95	25-[illegible]	[illegible]
278 Land	0-2	Very fine sandy loam.	ML, CL-ML	A-4	0	95-100	95-100	95-100	55-70	20-30	NP-10
	2-10	Gravelly sandy loam.	SM-SC	A-4, A-2	0	75-90	60-75	50-65	25-40	25-30	5-10
	10-60	Silt loam, silty clay loam.	CL	A-6	0	100	100	95-100	75-95	25-40	10-20
28[illegible] Land	0-2	Silty clay loam	CL	A-6, A-7	0	100	100	95-100	85-95	35-55	15-25
	2-64	Stratified silty clay to silt loam.	CL	A-6	0	100	100	95-100	8[illegible]-95	25-40	11-2[illegible]
300, 301 Las Vegas	0-1	Gravelly fine sandy loam.	SM	A-1, A-2	0	60-80	50-75	40-65	20-30	15-25	NP-5
	1-7	Fine sandy loam	SM	A-4	0	80-100	75-95	55-80	4[illegible]-50	---	NP
	7-11	Gravelly sandy clay loam, gravelly loam.	SC, GC	A-2, A-6	0	60-80	50-75	35-50	2[illegible]-45	25-35	10-15
	11	Indurated	---	---	---	---	---	---	---	---	---
302* Las Vegas	0-1	Gravelly fine sandy loam.	SM	A-1, A-2	0	60-80	50-75	40-65	20-30	15-25	NP-5
	1-7	Fine sandy loam	SM	A-4	0	80-100	75-95	65-80	40-5[illegible]	---	NP
	7-11	Gravelly sandy clay loam, gravelly loam.	SC, GC	A-2, A-6	0	60-80	50-75	35-50	25-45	25-35	10-15
	11	Indurated	---	---	---	---	---	---	---	---	---
McCarran	0-5	Fine sandy loam	SM	A-2	0	85-95	80-90	60-70	25-35	15-25	NP-5
	5-60	Gypsiferous material.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag-ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas-ticity index
	In				Pct					Pct	
302*:											
Grapevine--------	0-10	Very fine sandy loam.	ML	A-4	0	100	100	85-95	60-70	15-25	NP-5
	10-60	Stratified fine sandy loam to clay loam.	SM, SM-SC	A-4	0	80-95	75-90	60-75	35-45	15-25	NP-10
305*:											
Las Vegas---------	0-2	Gravelly fine sandy loam.	SM	A-1, A-2	0	50-80	50-75	40-65	25-50	15-25	NP-5
	2-8	Fine sandy loam	SM	A-4	0	80-100	75-95	65-80	40-50	---	NP
	8-12	Gravelly sandy clay loam, gravelly loam.	SC, GC	A-2, A-6	0	60-80	50-75	30-50	25-45	25-35	10-15
	12	Indurated---------	---	---	---	---	---	---	---	---	---
Destazo-----------	0-11	Fine sandy loam	SM	A-2, A-4	0	95-100	90-100	70-95	30-50	20-30	NP-5
	11-51	Very gravelly clay loam, extremely gravelly sandy clay loam.	GP-GC, GC	A-2	0	15-55	10-50	10-45	5-35	25-40	10-20
	51-62	Sandy loam, sandy clay loam.	SM, SC, [illegible]	A-[illegible], A-[illegible]	[illegible]	[illegible]	85-100	[illegible]	[illegible]	[illegible]	[illegible]
307*:											
Las Vegas--------	0-1	Gravelly fine sandy loam.	SM	A-1, A-2	[illegible]	[illegible]	[illegible]	[illegible]	25-50	15-25	NP-5
	1-7	Fine sandy loam	SM	A-4	0	[illegible]	[illegible]	[illegible]	[illegible]	---	NP
	7-11	Gravelly sandy clay loam, gravelly loam.	SC, GC	A-2, A-6	0	60-80	50-75	30-50	25-45	25-35	10-15
	11	Indurated---------	---	---	---	---	---	---	---	---	---
[illegible]	0-1	Very fine sandy loam.	SM, ML	A-4	[illegible]	90-100	75-100	70-95	[illegible]	15-25	NP-5
	1-8	Clay loam---------	CL	A-6	0	[illegible]-100	75-100	[illegible]	55-80	[illegible]-40	[illegible]
	8-37	Gravelly silty clay loam, gravelly loam, gravelly clay loam.	[illegible]	A-6	0-5	60-[illegible]	[illegible]	45-75	35-[illegible]	30-[illegible]	[illegible]
	37-60	Indurated---------	---	---	---	---	---	---	---	---	---
32[illegible]: McCarran-----	0-9	Fine sandy loam	SM	A-[illegible]	0	[illegible]	[illegible]	[illegible]	[illegible]5-35	[illegible]-25	NP-5
	9-62	Gypsiferous material.									
326--------------- McCarran	0-9	Very cobbly fine sandy loam.	GM	A-1	40-60	50-60	45-55	30-45	10-25	---	NP
	9-62	Gypsiferous material.	---	---	---	---	---	---	---	---	
[illegible]--------------- Paradise	0-10	Silt loam---------	CL-ML, ML	A-4	0	95-100	95-100	85-100	65-85	25-35	5-10
	10-39	Sandy loam, loam, silt loam.	ML, SM	A-4	0	85-100	85-100	65-90	45-70	20-25	NP-5
	39-61	Silt loam---------	CL-ML, ML	A-4	0	85-100	85-100	75-95	60-85	25-35	5-10
360*											
Rock outcrop.											
St. Thomas-------	0-7	Extremely cobbly fine sandy loam.	GM, SM	A-1	55-75	45-70	35-60	25-50	10-25	15-20	NP-5
	7	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
380: Skyhaven	0-1	Very fine sandy loam.	SM, ML	A-4	0	80-100	75-100	70-95	40-70	15-25	NP-5
	1-8	Clay loam	CL	A-6	0	80-100	75-100	70-95	55-80	35-40	15-20
	8-37	Gravelly silty clay loam, gravelly loam, gravelly clay loam.	CL, GC	A-6	0-5	60-80	50-75	45-70	35-65	30-40	10-20
	37-60	Indurated	---	---	---	---	---	---	---	---	---
390: Spring	0-11	Clay loam	CL	A-6, A-7	0	100	100	90-100	70-80	35-45	15-25
	11-43	Gypsiferous material.	---	---	---	---	---	---	---	---	---
	43-60	Clay loam, silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	90-100	75-90	35-45	5-25
400: Tencee	0-5	Very gravelly fine sandy loam.	GM, GP-GM	A-1	0-15	35-55	25-50	20-40	5-20	20-30	NP-5
	5-15	Very gravelly sandy loam, very gravelly loam, very gravelly fine sandy loam.	GM, GP-GM	A-1, A-2	0-25	35-55	25-50	15-40	5-30	20-30	NP-5
	15	Indurated	---	---	---	---	---	---	---	---	---
415: Aztec	0-2	Very gravelly sandy loam.	GM	A-1	0-30	45-60	30-50	20-35	10-20	15-20	NP-5
	2-30	Stratified very gravelly loam to extremely gravelly loamy coarse sand.	GP-GM, GM	A-1	0	30-40	15-35	10-25	5-15	15-20	NP-5
	30-60	Gypsiferous material.									
417*: Aztec	0-4	Very gravelly sandy loam.	GM	A-1	0-30	45-60	30-50	20-35	10-20	15-20	NP-5
	4-30	Stratified very gravelly loam to extremely gravelly loamy coarse sand.	GP-GM, GM	A-1	0	30-40	15-35	10-25	5-15	15-20	NP-5
	30-60	Gypsiferous material.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
418*: Aztec	0-4	Gravelly fine sandy loam.	SM	A-1	0-10	75-85	60-75	45-60	15-25	15-20	NP-5
	4-30	Stratified very gravelly loam to extremely gravelly loamy coarse sand	GP-GM, GM	A-1	0	30-40	15-35	10-25	5-15	15-20	NP-5
	30-60	Gypsiferous material.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
418*:											
Nickel----------	0-9	Gravelly fine sandy loam.	GM	A-1, A-2, A-4	0-5	55-65	50-60	40-50	20-40	---	NP
	9-23	Extremely gravelly sandy loam, very gravelly sandy loam.	GM, GP-GM, GP	A-1	0-5	25-50	10-40	5-20	0-15	15-25	NP-5
	23-45	Stratified very gravelly fine sandy loam to extremely gravelly loamy sand	GP-GM, GP	A-1	0-5	25-50	10-40	5-20	0-10	---	NP
	45	Weathered bedrock.	---	---	---	---	---	---	---	---	---
Knob Hill--------	0-7	Loamy sand	SM	A-2	0	85-100	80-95	50-60	15-30	---	NP
	7-23	Stratified sandy loam to very gravelly loamy sand.	GM, SM	A-1	0-10	50-75	50-70	30-60	10-25	---	NP
	23-37	Stratified gravelly fine sandy loam to gravelly loamy sand.	GM, SM	A-1, A-2	0-5	50-75	50-70	30-60	10-30	---	NP
	37-60	Stratified loamy fine sand to very gravelly loamy sand.	SM	A-1, A-2	0-10	65-90	60-85	40-60	10-25	---	NP
419*:											
Aztec-----------	0-4	Gravelly fine sandy loam.	SM	A-[illegible]	0-[illegible]	75-85	[illegible]-75	45-60	15-25	15-20	NP-5
	4-30	Stratified very gravelly loam to extremely gravelly loamy coarse sand.	GP-GM, GM	A-1	0	30-40	15-35	10-25	5-15	15-20	NP-5
	30-60	Gypsiferous material.	---	---	---	---	---	---	---	---	---
Bracken---------	0-1	Very gravelly fine sandy loam.	GM	A-1	0-5	30-50	25-45	20-40	0-25	---	NP
	1-60	Gypsiferous material.	---	---	---	---	---	---	---	---	---
430------ Knob Hill	0-7	Loamy sand-------	SM	A-2	0	85-100	80-95	50-60	15-30	---	NP
	7-23	Stratified sandy loam to very gravelly loamy sand.	GM, SM	A-1	0-10	50-75	50-70	30-60	10-25	---	NP
	23-37	Stratified gravelly fine sandy loam to gravelly loamy sand.	GM, SM	A-1, A-2	0-5	50-75	50-70	30-60	10-30	---	NP
	37-60	Stratified loamy fine sand to very gravelly loamy sand	SM	A-1, A-2	0-10	65-90	60-85	40-60	10-25	---	NP

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
44[illegible]: Nickel	0-9	Very gravelly fine sandy loam.	GM	A-1, A-2	0-5	45-60	4[illegible]-50	25-40	15-30	---	NP
	9-23	Extremely gravelly sandy loam, very gravelly sandy loam.	GM, GP-GM, GP	A-1	0-5	25-50	10-40	5-20	0-15	15-25	NP-5
	23-45	Stratified very gravelly fine sandy loam to extremely gravelly loamy sand	GP-GM, GP	A-1	0-5	25-50	10-[illegible]	5-20	0-10	---	NP
	45	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
450: Cave Variant	0-2	Very cobbly very fine sandy loam.	GM	A-1, A-2	25-50	45-65	40-60	35-50	20-35	2[illegible]-3[illegible]	NP-5
	2-11	Very gravelly very fine sandy loam, extremely gravelly fine sandy loam.	GM	A-1, A-2	10-25	25-55	20-50	15-45	10-30	20-30	NP-[illegible]
	11-29	Indurated	---	---	---	---	---	---	---	---	---
	29-40	Gravelly clay loam, gravelly fine sandy loam, gravelly sandy clay loam.	SC, SM	A-6, A-2	0-15	65-[illegible]	60-70	45-60	20-45	20-40	5-15
	40-60	Very cobbly coarse sandy loam, very gravelly sandy loam	GM	A-1, A-2	15-40	45-65	40-60	15-35	0-30	---	NP
46[illegible]: [illegible]	0-4	Loamy fine sand	SM	A-2	0	100	100	80-90	25-[illegible]	---	NP
	4-13	Very gravelly sandy loam, very cobbly loam.	GM-GC	A-2, A-4	20-60	50-65	45-60	45-55	30-45	20-30	5-10
	13	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
48[illegible]: Hobog	0-9	Very cobbly fine sandy loam.	GM-GC	A-2, A-4, A-1	15-60	50-75	45-70	40-55	20-45	20-30	5-10
	9-15	Very cobbly loam, very flaggy loam, very gravelly sandy loam.	GM-GC	A-2, A-4	10-60	50-65	35-60	25-55	20-45	20-30	5-10
	15	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
500*: Canutio	0-4	Very cobbly sandy loam.	GM, SM	A-1, A-2	30-45	45-75	40-70	25-55	15-35	<20	NP-5
	4-43	Very gravelly sandy loam, extremely gravelly sandy loam.	GM	A-1	0-5	40-50	20-30	15-25	10-20	<20	NP-5
	43	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
500*:											
Akela----------	0-3	Very cobbly fine sandy loam.	GM, SM	A-1, A-2	25-55	55-70	50-65	40-55	20-30	15-20	NP-5
	3-11	Very gravelly fine sandy loam, extremely gravelly fine sandy loam.	GP-GM	A-1	0-5	30-40	10-30	10-25	5-10	---	NP
	11	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
501-------------- Canutio	0-11	Gravelly fine sandy loam.	SM, SM-SC	A-1, A-2	5-15	60-80	55-75	40-60	20-35	<25	NP-10
	11-60	Stratified very gravelly sandy loam to very gravelly loam.	GM, GM-GC, SM, SM-SC	A-1, A-2	10-30	35-75	30-70	15-50	10-30	<25	NP-10
502*:											
Canutio----------	0-9	Gravelly fine sandy loam.	SM, SM-SC	A-1, A-2	5-15	60-80	55-75	40-60	20-35	<25	NP-10
	9-60	Stratified very gravelly sandy loam to very gravelly loam.	GM, GM-GC, SM, SM-SC	A-1, A-2	10-30	35-75	30-70	15-50	10-30	<25	NP-10
Cave-------------	0-16	Gravelly fine sandy loam.	SM	A-2, A-4	0-5	70-90	60-75	45-65	25-40	20-25	NP-5
	16-30	Indurated--------	---	---	---	---	---	---	---	---	---
	30-60	Gravelly loamy sand, very gravelly sandy loam.	GM, SM	A-1, A-2	0-5	35-75	30-60	20-35	10-30	---	NP
505*:											
Canutio---------	0-10	Very cobbly sandy loam.	GM, SM	A-1, A-2	30-45	45-75	40-70	25-55	15-35	<20	NP-5
	10-43	Very gravelly sandy loam, extremely gravelly sandy loam.	GM	A-1	0-5	40-50	20-30	15-25	10-20	<20	NP-5
	43	Weathered bedrock.	---	---	---	---	---	---	---	---	---
Akela-----------	0-3	Very cobbly fine sandy loam.	GM, SM	A-1, A-2	25-55	55-70	50-65	40-55	20-30	15-20	NP-5
	3-11	Very gravelly fine sandy loam, extremely gravelly fine sandy loam.	GP-GM	A-1	0-5	30-40	10-30	10-25	5-10	---	NP
	11	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
512*:											
Akela-----------	0-3	Very cobbly fine sandy loam.	GM, SM	A-1, A-2	25-55	55-70	50-65	40-55	20-30	15-20	NP-5
	3-11	Very gravelly fine sandy loam, extremely gravelly fine sandy loam.	GP-GM	A-1	0-30	30-40	10-35	10-30	5-10	---	NP
	11	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
540 Weiser	0-1	Extremely gravelly fine sandy loam.	GM, GM-GC, GP-GC, GP-GM	A-1, A-2	0-15	15-35	10-30	10-25	5-15	15-25	NP-10
	1-63	Extremely gravelly fine sandy loam, extremely gravelly sandy loam.	GP-GM, GP-GC	A-1, A-2	10-25	25-45	10-30	10-20	5-10	15-25	NP-10
542*: Weiser	0-1	Extremely gravelly fine sandy loam.	GM, GM-GC, GP-GC, GP-GM	A-1, A-2	0-15	15-35	10-30	10-25	5-15	15-25	NP-10
	1-63	Extremely gravelly fine sandy loam, extremely gravelly sandy loam.	GP-GM, GP-GC	A-1, A-2	10-25	25-45	10-30	10-20	5-10	15-25	NP-10
Aztec	0-4	Very gravelly fine sandy loam.	GM	A-1	0-30	45-60	30-50	20-40	10-20	15-20	NP-5
	4-30	Stratified very gravelly loam to extremely gravelly loamy coarse sand.	GP-GM, GM	A-1	0	30-40	15-35	10-25	5-15	15-20	NP-5
	30-60	Gypsiferous material.	---	---	---	---	---	---	---	---	---
545*: Weiser	0-1	Extremely gravelly fine sandy loam.	GM, GM-GC, GP-GC, GP-GM	A-1, A-2	0-15	15-35	10-30	10-25	5-15	15-25	NP-10
	1-63	Extremely gravelly fine sandy loam, extremely gravelly sandy loam.	GP-GM, GP-GC	A-1, A-2	10-25	25-45	10-30	10-20	5-10	15-25	NP-10
Goodsprings	0-5	Very gravelly fine sandy loam	GM	A-1	0	35-55	30-50	20-40	10-25		NP
	5-15	Gravelly fine sandy loam.	SM, GM	A-2	0-10	60-75	55-70	45-55	25-35	---	NP
	15-52	Cemented	---	---	---	---	---	---	---	---	---
	52-60	Extremely gravelly loamy fine sand, extremely gravelly sandy loam.	GP, GP-GM	A-1	10-15	15-50	10-25	5-20	0-10	---	NP
600*. Slickens											
605*. Dumps											
610*. Pits											
615*. Urban land											
630*. Badlands											
635*, 640*. Rock outcrop											

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
645* Pits											

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS

[The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated]

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group
	In	Pct	In/hr	In/in	pH	Mmhos/cm				
1[illegible]*:										
McCullough	[illegible]-2	[illegible]	[illegible]	[illegible]0.13-0.15	7.9-9.0	<2	Low	[illegible]	[illegible]	3
	2-35	8-18	0.6-2.0	0.13-0.15	7.9-9.0	2-4	[illegible]	[illegible]		
	35-62	2-8	6.0-20	0.07-0.09	8.5-9.0	2-4	Low	[illegible]		
[illegible]	0-1	0-5	6.0-20	0.08-0.10	7.9-9.0	<2	Low	0.20	5	2
	1-18	0-5	6.0-20	0.08-0.10	7.9-9.0	<2	[illegible]	[illegible]		
	18-60	0-5	6.0-20	0.03-0.06	7.9-9.0	<2	[illegible]	[illegible]		
Bluepoint	0-2	2-6	6.0-20	0.06-0.10	7.4-9.0	<2	Low	0.17	5	2
	2-60	2-6	6.0-20	0.05-0.09	7.9-9.0	<4	Low	[illegible]		
[illegible] Arizo	0-4	10-15	0.6-2.0	0.05-0.07	7.4-9.0	<2	Low	0.20	5	8
	4-60	2-10	>20	0.04-0.06	7.4-9.0	<2	[illegible]	[illegible]		
[illegible]2 Arizo	0-2	2-8	6.0-20	0.04-0.06	7.4-9.0	<2	Low	0.15	5	4
	2-60	0-5	>20	0.04-0.06	7.4-9.0	<2	Low	0.10		
[illegible] Arizo	0-2	3-8	2.0-6.0	0.03-0.07	7.4-8.4	<2	Low	0.17	5	5
	2-40	2-7	>20	0.03-0.06	7.4-8.4	<2	Low	0.15		
	40-60	---	---	---	---	---	---	---		
1[illegible] Arizo	0-6	5-12	2.0-6.0	0.04-0.07	7.4-8.4	<2	Low	0.17	5	5
	6-60	1-6	>20	0.03-0.04	7.4-8.4	<2	Low	0.10		
120 Bluepoint	0-4	3-10	2.0-6.0	0.12-0.14	7.4-8.4	<2	Low	0.28	5	3
	4-60	2-8	6.0-20	0.06-0.10	7.4-8.4	<2	Low	[illegible]		
127 Bluepoint	0-9	2-6	6.0-20	0.06-0.10	7.4-9.0	<2	Low	0.17	5	2
	9-24	2-6	6.0-20	0.05-0.08	7.9-9.0	<4	Low	0.15		
	24-41	2-6	6.0-20	0.05-0.09	7.9-9.0	<4	Low	[illegible]		
	41-60	2-10	2.0-6.0	0.05-0.14	7.9-9.0	<4	Low	[illegible]		
128 Bluepoint	0-9	2-6	6.0-20	0.05-0.08	7.4-9.0	<2	Low	0.15	5	3
	9-24	2-6	6.0-20	0.05-0.08	7.9-9.0	<4	Low	0.15		
	24-41	2-6	6.0-20	0.05-0.09	7.9-9.0	<4	Low	[illegible]		
	41-60	2-10	2.0-6.0	0.05-0.14	7.9-9.0	<4	Low	[illegible]		
129 Bluepoint	0-2	2-6	6.0-20	0.06-0.10	7.4-9.0	<2	Low	0.17	5	2
	2-60	2-6	6.0-20	0.05-0.09	7.9-9.0	<4	Low	[illegible]		
130*:										
Bracken	0-1	4-10	2.0-6.0	0.06-0.12	7.4-8.4	<2	Low	0.10	4	6
	1-60	---	---	---	---	---	---	---		
[illegible]	0-10	[illegible]	[illegible]	[illegible]-0.12	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	10-31	20-35	0.2-0.6	0.05-0.10	7.9-8.4	<4	[illegible]	[illegible]		
	31-60	15-20	2.0-6.0	0.09-0.11	7.9-8.4	<4	Low	[illegible]		
132 Bracken	0-5	4-10	2.0-6.0	0.06-0.11	7.4-8.4	<2	Low	0.10	4	6
	5-60	---	---	---	---	---	---	---		
133*:										
Bracken	0-[illegible]	4-[illegible]	2.0-6.0	0.06-0.11	7.4-8.4	<2	Low	0.10	4	6
	[illegible]-60		---	---	---	---	---	---		
[illegible]										
134 Bracken	0-1	4-10	2.0-6.0	0.06-0.11	7.4-8.4	<2	Low	0.10	4	6
	1-60	---	---	---	---	---	---	---		

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group
	In	Pct	In/hr	In/in	pH	Mmhos/cm				
140----------------- Casaga	0-1	20-30	0.2-0.6	0.08-0.10	>8.4	8-16	Moderate-----	[illegible]	5	7
	1-21	27-35	0.06-0.2	0.19-0.21	>8.4	4-9	Moderate-----	[illegible]		
	21-41	27-35	0.2-0.6	0.08-0.11	>8.4	4-9	Moderate-----	0.17		
	41-60	8-18	2.0-6.0	0.06-0.10	7.4-9.0	8-16	Low---------	[illegible]		
150----------------- Cave	0-6	10-20	0.6-2.0	0.06-0.10	7.4-8.4	<2	Low------------	0.10	1	5
	6-60	---	---	---	---	---	------------	----		
151----------------- Cave	0-5	3-8	6.0-20	0.09-0.11	7.9-8.4	2-4	Low------------	0.17	1	2
	5-11	10-20	0.6-2.0	0.07-0.12	7.9-8.4	2-4	Low------------	[illegible]		
	11-60	---	---	---	---	---	------------	----		
152----------------- Cave	0-12	10-20	0.6-2.0	0.07-0.12	7.9-8.4	2-4	Low------------	0.20	1	4L
	12-36	---	---	---	---	---	------------	----		
	36-60	2-5	2.0-6.0	0.04-0.06	7.9-8.4	4	Low------------	[illegible]		
155----------------- Cave	0-15	10-20	0.6-2.0	0.07-0.12	7.9-8.4	2-4	Low------------	0.20	1	4L
	15-60	---	---	---	---	---	------------	----		
160----------------- Destazo	0-11	8-18	2.0-6.0	[illegible]-0.12	7.9-8.4	<4	Low------------	[illegible]	5	[illegible]
	11-40	20-35	0.2-0.6	0.05-0.10	7.9-8.4	<4	Low------------	0.10		
	40-60	15-20	2.0-6.0	0.09-0.11	7.9-8.4	<4	Low------------	0.17		
181*: Caliza---------------	0-2	4-10	2.0-6.0	0.05-0.08	7.9-8.4	<2	Low------------	0.05	5	6
	2-14	3-8	2.0-6.0	0.05-0.10	7.9-8.4	<2	Low------------	0.10		
	14-60	2-8	6.0-20	0.03-0.07	7.9-8.4	<2	Low------------	0.05		
Pittman---------------	0-2	5-15	6.0-20	0.04-0.08	7.4-8.4	<2	Low------------	0.10	2	8
	2-23	2-12	6.0-20	0.04-0.08	7.9-8.4	<2	Low------------	0.17		
	23-32	---		---	---	---	------------	----		
	32-50	---	---	---	---	---	------------	----		
	50-60	0-5	6.0-20	0.03-0.06	7.4-8.4	<8	Low------------	0.05		
182*: Caliza---------------	0-2	4-10	2.0-6.0	0.05-0.08	7.9-8.4	<2	Low------------	0.05	5	6
	2-14	3-8	2.0-6.0	0.05-0.10	7.9-8.4	<2	Low------------	0.10		
	14-60	2-8	6.0-20	0.03-0.07	7.9-8.4	<2	Low------------	0.05		
Pittman---------------	0-2	5-15	6.0-20	0.04-0.06	7.4-8.4	<2	Low------------	0.10	2	8
	2-23	2-12	6.0-20	0.04-0.08	7.9-8.4	<2	Low------------	0.17		
	23-32	---	---	---	---	---	------------	----		
	32-50	---	---	---	---	---	------------	----		
	50-60	0-5	6.0-20	0.03-0.06	7.4-8.4	<8	Low------------	0.05		
Arizo-----------------	0-8	2-8	6.0-20	0.04-0.06	7.4-9.0	<2	Low------------	0.15	5	4
	8-60	0-5	>20	0.04-0.06	7.4-9.0	<2	Low------------	0.10		
183----------------- Caliza	0-3	2-6	6.0-20	0.04-0.07	7.9-8.4	<2	Low------------	0.05	5	5
	3-60	2-8	2.0-6.0	0.03-0.07	7.9-8.4	<2	Low------------	0.05		
184----------------- Caliza	0-3	5-10	2.0-6.0	0.05-0.07	7.9-8.4	<2	Low------------	0.10	5	5
	3-16	5-10	2.0-6.0	0.05-0.08	7.9-8.4	<2	Low------------	[illegible]		
	16-60	3-8	6.0-20	0.03-0.06	7.9-8.4	<2	Low------------	0.15		
187----------------- Caliza	0-2	4-10	2.0-6.0	0.05-0.08	7.9-8.4	<2	Low------------	0.05	5	6
	2-14	3-8	2.0-6.0	[illegible]	7.9-8.4	<2	Low------------	[illegible]		
	14-60	2-8	6.0-20	0.03-0.07	7.9-8.4	<2	Low------------	0.05		
190----------------- Callan	0-4	5-10	2.0-6.0	0.05-0.09	7.9-8.4	<2	Low------------	0.15	5	5
	4-60	3-12	2.0-6.0	0.05-0.09	7.9-8.4	<2	Low------------	0.15		
191----------------- Callan	0-5	5-10	2.0-6.0	0.05-0.09	7.9-8.4	<2	Low------------	0.15	5	8
	5-60	3-12	2.0-6.0	0.05-0.09	7.9-8.4	<2	Low------------	0.15		
192*: Callan---------------	0-5	5-10	2.0-6.0	0.05-0.09	7.9-8.4	<2	Low------------	0.15	5	5
	5-60	3-12	2.0-6.0	0.05-0.09	7.9-8.4	<2	Low------------	0.15		

See footnote at end of table.

TABLE 18.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group
	In	Pct	In/hr	In/in	pH	Mmhos/cm				
192*: McCullough	0-5	10-14	0.6-2.0	0.05-0.07	7.9-8.4	<2	Low	0.10	5	5
	5-30	8-18	0.6-2.0	0.12-0.18	7.9-8.4	<2	Low	0.32		
	30-40	2-8	6.0-20	0.07-0.09	7.9-8.4	<2	Low	0.15		
	40-60	2-6	6.0-20	0.04-0.06	7.9-8.4	<2	Low	[illegible]		
200 Glencarb	0-6	10-20	0.6-2.0	0.19-0.21	7.9-9.0	<4	Low	0.55	5	1
	6-60	18-35	0.2-0.6	0.17-0.19	7.9-9.0	4-8	Moderate	0.55		
216 Glencarb	0-8	10-20	0.6-2.0	0.19-0.21	7.9-9.0	4-8	Low	0.55	5	6
	8-60	20-35	0.2-0.6	0.18-0.21	7.9-9.0	8-16	Moderate	0.49		
2[illegible] Glencarb	0-6	27-35	0.2-0.6	0.19-0.21	7.9-9.0	4-8	Moderate	0.37	5	[illegible]
	6-60	20-35	0.2-0.6	0.19-0.21	7.9-9.0	8-16	Moderate	0.49		
23[illegible] Glencarb	0-6	10-20	0.6-2.0	0.15-0.17	7.9-9.0	4-8	Low	0.32	5	4L
	6-60	[illegible]	0.2-0.6	0.17-0.19	7.9-9.0	8-16	Moderate	0.55		
23[illegible] Glencarb	0-6	10-20	0.6-2.0	0.15-0.17	7.9-9.0	<2	Low	0.32	5	3
	6-42	18-35	0.2-0.6	0.10-0.12	7.9-9.0	8-16	Moderate	0.43		
	42-60	---	---	---	---	---	---	---		
2[illegible] Goodsprings	0-5	7-12	2.0-6.0	0.10-0.12	>7.8	<2	Low	0.15	1	4
	5-15	5-12	0.6-2.0	0.09-0.11	>7.8	<4	Low	0.15		
	15-52	---	---	---	---	---	---	---		
	52-60	5-10	6.0-20	0.04-0.07	>7.8	<4	Low	0.32		
2[illegible] Grapevine	0-5	10-15	0.6-2.0	0.16-0.18	7.9-9.0	2-4	Low	0.43	5	5
	5-69	10-18	0.6-2.0	0.12-0.15	7.9-9.0	4-8	Low	0.32		
25[illegible] Grapevine	0-10	5-10	6.0-20	0.08-0.11	7.9-9.0	2-4	Low	0.15	5	2
	10-60	10-18	0.6-2.0	0.12-0.15	7.9-9.0	4-8	Low	0.32		
260 Jean	0-1	0-5	6.0-20	0.06-0.08	7.9-9.0	<2	Low	0.17	5	6
	1-18	0-5	6.0-20	0.08-0.10	7.9-9.0	<2	Low	0.20		
	18-60	0-5	6.0-20	0.03-0.06	7.9-9.0	<2	Low	0.10		
262*: Jean	0-2	0-5	6.0-20	0.06-0.08	7.9-9.0	<2	Low	0.17	5	6
	2-12	0-5	6.0-20	0.08-0.10	7.9-9.0	<2	Low	0.20		
	12-48	0-5	6.0-20	0.03-0.06	7.9-9.0	<2	Low	0.10		
Jean	0-1	0-5	6.0-20	0.04-0.07	7.9-9.0	<2	Low	0.10	5	5
	1-11	0-5	6.0-20	0.08-0.10	7.9-9.0	<2	Low	0.20		
	11-60	0-5	6.0-20	[illegible]	7.9-9.0	<2	Low	[illegible]		
Goodsprings	0-5	7-12	2.0-6.0	0.10-0.12	>7.8	<2	Low	0.15	1	4
	5-15	5-12	0.6-2.0	0.09-0.11	>7.8	<4	Low	[illegible]		
	15-52	---	---	---	---	---	---	---		
	52-60	5-10	6.0-20	0.04-0.07	>7.8	<4	Low	0.32		
263*: Jean	0-1	0-5	6.0-20	0.06-0.08	7.9-9.0	<2	Low	[illegible]	5	6
	1-11	0-5	6.0-20	0.08-0.10	7.9-9.0	<2	Low	[illegible]		
	11-60	0-5	6.0-20	0.03-0.06	7.9-9.0	<2	Low	[illegible]		
Jean	0-1	0-5	6.0-20	0.04-0.07	7.9-9.0	<2	Low	0.10	5	5
	1-11	0-5	6.0-20	0.08-0.10	7.9-9.0	<2	Low	0.20		
	11-60	0-5	6.0-20	0.06-0.08	7.9-9.0	<2	Low	[illegible]		
26[illegible] Jean	0-1	0-5	6.0-20	0.04-0.07	7.9-9.0	<2	Low	0.10	5	8
	1-18	0-5	6.0-20	0.08-0.10	7.9-9.0	<2	Low	0.20		
	18-60	0-5	6.0-20	0.03-0.06	7.9-9.0	<2	Low	0.10		
27[illegible] Land	0-6	15-27	0.6-2.0	0.19-0.21	8.5-9.0	>16	Moderate	0.43	5	6
	6-60	18-35	0.2-0.6	0.13-0.19	>7.8	>16	Moderate	0.37		

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group
	In	Pct	In/hr	In/in	pH	Mmhos/cm				
278------------- Land	0-2	12-20	0.6-2.0	0.15-0.17	8.5-9.0	8-16	Low------------	0.28	5	3
	2-10	15-20	2.0-6.0	0.09-0.12	>7.8	>16	Low------------	0.24		
	10-60	18-35	0.2-0.6	0.19-0.21	>7.8	>16	Moderate--------	0.37		
282------------- Land	0-2	27-35	0.2-0.6	0.19-0.21	8.5-9.0	>16	Moderate--------	0.37	5	7
	2-60	18-35	0.2-0.6	0.17-0.19	>7.8	>16	Moderate--------	0.37		
300, 301--------- Las Vegas	0-1	5-15	2.0-6.0	0.08-0.11	7.9-9.0	<2	Low------------	0.20	1	4
	1-7	5-10	2.0-6.0	0.12-0.15	7.9-9.0	<4	Low------------	0.32		
	7-11	18-27	0.2-0.6	0.12-0.15	7.9-9.0	<4	Moderate--------	0.20		
	11	---	---	---	---	---	-------------	----		
302*:										
Las Vegas--------	0-1	8-15	2.0-6.0	0.08-0.11	7.9-9.0	<2	Low------------	0.20	1	4
	1-7	5-10	2.0-6.0	0.12-0.15	7.9-9.0	<4	Low------------	0.32		
	7-11	18-27	0.2-0.6	0.12-0.15	7.9-9.0	<4	Moderate--------	0.20		
	11	---	---	---	---	---	-------------	----		
McCarran---------	0-5	8-14	2.0-6.0	0.13-0.15	7.9-8.4	4-8	Low------------	0.28	5	3
	5-60	---	---	---	---	---	-------------	----		
Grapevine--------	0-10	10-15	0.6-2.0	0.16-0.18	7.9-9.0	2-4	Low------------	0.43	5	5
	10-60	10-18	0.6-2.0	0.12-0.15	8.5-9.0	4-8	Low------------	0.32		
305*:										
Las Vegas--------	0-2	8-15	2.0-6.0	0.08-0.11	7.9-9.0	<2	Low------------	0.20	1	4
	2-8	5-10	2.0-6.0	0.12-0.15	7.9-9.0	<4	Low------------	0.32		
	8-12	18-27	0.2-0.6	0.12-0.15	7.9-9.0	<4	Moderate--------	0.20		
	12	---	---	---	---	---	-------------	----		
Destazo----------	0-11	8-18	2.0-6.0	0.09-0.12	7.9-8.4	<4	Low------------	0.20	5	3
	11-51	20-35	0.2-0.6	0.03-0.09	7.9-8.4	<4	Moderate--------	0.17		
	51-62	10-25	0.2-0.6	0.11-0.16	7.9-8.4	<4	Low------------	0.24		
307*:										
Las Vegas--------	0-1	8-15	2.0-6.0	0.08-0.11	7.9-9.0	<2	Low------------	0.20	1	4
	1-7	5-10	2.0-6.0	0.12-0.15	7.9-9.0	<4	Low------------	0.32		
	7-11	18-27	0.2-0.6	0.12-0.15	7.9-9.0	<4	Moderate--------	0.20		
	11	---	---	---	---	---	-------------	----		
Skyhaven---------	0-1	5-15	0.6-2.0	0.14-0.16	>7.8	4-8	Low------------	0.28	2	3
	1-8	27-35	0.2-0.6	0.16-0.19	>7.8	4-8	Moderate--------	0.32		
	8-37	20-35	0.2-0.6	0.12-0.16	>7.8	8-16	Moderate--------	0.17		
	37-60	---	---	---	---	---	-------------	----		
325------------- McCarran	0-9	8-14	2.0-6.0	0.13-0.15	7.9-8.4	4-8	Low------------	0.28	5	3
	9-62	---	---	---	---	---	-------------	----		
326------------- McCarran	0-9	7-12	2.0-6.0	0.08-0.11	7.9-8.4	4-8	Low------------	0.20	5	5
	9-62	---	---	---	---	---	-------------	----		
341------------- Paradise	0-10	14-22	0.6-2.0	0.17-0.20	>7.8	8-16	Low------------	0.43	5	6
	10-39	8-18	0.6-2.0	0.14-0.18	>7.8	2-4	Low------------	0.43		
	39-61	14-22	0.6-2.0	0.18-0.20	>7.8	2-4	Low------------	0.55		
360*: Rock outcrop.										
St. Thomas-------	0-7	4-15	2.0-6.0	[illegible]	[illegible]	<2	Low------------	0.10	1	8
	7	---	---	---	---	---	-------------	----		
381------------- Skyhaven	0-1	5-15	0.6-2.0	0.14-0.16	>7.8	4-8	Low------------	0.28	2	3
	1-8	27-35	0.2-0.6	0.16-0.19	>7.8	4-8	Moderate--------	0.32		
	8-37	20-35	0.2-0.6	0.12-0.16	>7.8	8-16	Moderate--------	0.17		
	37-60	---	---	---	---	---	-------------	----		
390------------- Spring	0-11	27-35	0.06-0.2	0.17-0.19	>8.5	>16	Moderate--------	0.32	5	6
	11-43	---	---	---	---	---	-------------	----		
	43-60	25-35	0.06-0.2	0.17-0.19	>8.5	8-16	Moderate--------	0.32		

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group
	In	Pct	In/hr	[illegible]	pH	Mmhos/cm				
400 Tencee	0-5	10-20	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.15	1	5
	5-15	10-20	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		
	15-60	---	---	---	---	---	------------	----		
415 Aztec	0-2	6-12	[illegible]	[illegible]	[illegible]	2	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		
	[illegible]	---	---	---	---	---	[illegible]			
[illegible]* [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		
	[illegible]	---	---	---	---	---	------------	[illegible]		
Rock outcrop.										
418* [illegible]	[illegible]	[illegible]	[illegible]	0.06-0.1	[illegible]	2	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		
	[illegible]	---	---	---	---	---	------------	----		
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2	[illegible]		[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		
	[illegible]	2-	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		
	[illegible]	---	---	---	---		------------	----		
Knob Hill[illegible]	[illegible]	3-8	[illegible].0-20	[illegible].06-0.08	7.9-8.4	<2	Low	[illegible]	[illegible]	
	[illegible]	3-1[illegible]	[illegible].0-6.[illegible]	.06-0.08	7.9-8.4	<2	Low	[illegible]		
	[illegible]3-37	3-1[illegible]	[illegible].0-6.[illegible]	.06-0.08	7.9-9.0	<4	Low	[illegible]		
	[illegible]7-60	3-8	[illegible].0-2	[illegible].05-0.07	7.9-9.0	<4	Low	[illegible]		
419*: Aztec	0-4	3-12	[illegible].0-2	[illegible].06-0.10	7.4-9.0	<2	Low	[illegible]		[illegible]
	4-60	3-1[illegible]	[illegible].2-0.[illegible]	[illegible].06-0.08	7.4-9.0	4-8	Low	[illegible]		
[illegible]	[illegible]	[illegible]	2.0-6.[illegible]	0.06-0.11	7.4-8.4	[illegible]	Low	0.10	[illegible]	[illegible]
	[illegible]	---	---	---	---	---	------------	----		
430 Knob Hill	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Low	0.17	5	[illegible]
	[illegible]	[illegible]	[illegible]	0.06-0.0[illegible]	[illegible]	[illegible]	Low	0.17		
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Low	0.17		
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Low	0.17		
[illegible]	[illegible]	[illegible]	2.0-6.0	[illegible]	[illegible]	2	[illegible]	[illegible]	5	5
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	<2	[illegible]	[illegible]		
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Low	[illegible]		
	[illegible]	---	---	---	---	---	------------	----		
[illegible]	[illegible]	7-15	[illegible]	0.06-0.09	7.9-8.4	[illegible]	[illegible]	[illegible]	[illegible]	
	[illegible]	[illegible]	[illegible]	0.04-0.08	7.9-8.4	2	[illegible]	[illegible]		
	[illegible]	---	---	---	---	---	------------	----		
	29-40	12-30	[illegible]	0.10-0.14	7.9-8.4	8-16	Moderate	[illegible]		
	40-60	5-10	[illegible]	0.05-0.09	7.4-7.8	8-16	[illegible]	[illegible]		
481 Hobog	0-4	1-5	6.0-20	0.08-0.10	7.4-[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	4-13	12-25	0.6-2.0	0.04-0.06	7.4-[illegible]	2	[illegible]	[illegible]		
	[illegible]	---	---	---	---	---	------------	----		
[illegible] Hobog	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		Low	[illegible]	[illegible]	6
	[illegible]	[illegible]-21	[illegible]	[illegible]	[illegible]	2	[illegible]	[illegible]		
	[illegible]	---	---	---	---	---	------------	----		
500*: Canotic	0-[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	<2	[illegible]	[illegible]		
	[illegible]		---		---	---	------------	----		
[illegible]	[illegible]	5-1[illegible]	[illegible]	0.04-0.09	7.4-8.4	[illegible]	[illegible]	[illegible]	[illegible]	5
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2	[illegible]	[illegible]		
	[illegible]	---	---	---	---	---	------------	----		

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group
	In	Pct	In/hr	In/in	pH	Mmhos/cm				
501 Canutio	0-11	8-18	2.0-6.0	0.08-0.11	7.9-9.0	<4	Low	0.10	5	3
	11-60	8-18	2.0-6.0	0.06-0.08	7.9-9.0	<4	Low	0.05		
502*:										
Canutio	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	9-60	8-18	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		
[illegible]	0-16	10-20	0.6-2.0	0.07-0.12	7.9-8.4	2-4	Low	0.20	1	4L
	16-30	---	---	---	---	---	---	---		
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Low	[illegible]		
[illegible]*										
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	<2	Low	0.10	3	8
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		
	[illegible]	---	---	---	---	---	---			
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		
	[illegible]	---	---	---	---	[illegible]	---	---		
[illegible]*										
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	<2	Low	0.17	1	5
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	<2	[illegible]	[illegible]		
	[illegible]	---		---		---	---	---		
Rock outcrop.										
[illegible] Weiser	[illegible]	[illegible]	[illegible]	0.04-0.06	7.9-9.0	<2	Low	0.10	5	5
	1-63	[illegible]	[illegible]	0.04-0.06	7.9-9.0	<2	[illegible]	[illegible]		
[illegible]*										
Weiser	[illegible]	[illegible]	[illegible]	0.04-0.06	7.9-9.0	<2	Low	0.10	5	5
	[illegible]	[illegible]	[illegible]	0.04-0.06	7.9-9.0	<2	[illegible]			
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	<2	Low	0.10	5	6
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	4-8	Low	0.15		
	[illegible]	---	---	---	---	---	---	---		
[illegible]*										
Weiser	0-1	5-18	2.0-6.0	0.04-0.06	7.9-9.0	<2	Low	0.10	5	5
	1-63	5-18	2.0-6.0	0.04-0.06	7.9-9.0	<2	[illegible]	[illegible]		
Goodsprings	0-5	5-10	2.0-6.0	0.05-0.09	>7.8	<2	Low	0.10	1	5
	5-15	5-12	0.6-2.0	0.09-0.11	>7.8	<4	[illegible]	[illegible]		
	15-52	---	---	---	---	---	---	---		
	52-60	5-10	6.0-20	0.04-0.07	>7.8	<4	Low	[illegible]		
600*. Slickens										
605*. Dumps										
610*. Pits										
615*. Urban land										
630*. Badlands										
635*, 640*. Rock outcrop										
645*. Pits										

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--SOIL AND WATER FEATURES

["Flooding" and "water table" and terms such as "rare" and "occasional" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern]

Soil name and map symbol	Hydro-logic group	Flooding		High water table		Bedrock		Cemented pan		Risk of corrosion	
		Frequency	Months	Depth	Months	Depth	Thick-ness	Depth	Hard-ness	Uncoated steel	Concrete
				Ft		In		In			
105*:											
McCullough	B	Rare	---	>6.0	---	>60	---	---	---	High	High.
Leon	A	Rare	---	>6.0	---	>60	---	---	---	High	Low.
Bluepoint	A	None	---	>6.0	---	>60	---	---	---	High	Low.
107 Arizo	A	Rare	---	>6.0	---	>60	---	---	---	High	Low.
1[illegible] Arizo	A	Occasional	Mar-Sep	>6.0	---	>60	---	---	---	High	Low.
1[illegible] Arizo	A	Rare	---	>6.0	---	>60	---	---	---	High	High.
1[illegible] Arizo	A	None	---	>6.0	---	>60	---	---	---	High	Low.
1[illegible] Bluepoint	A	Rare	---	4.0-6.0	Jun-Sep	>60	---	---	---	High	Moderate.
127, 128, 129 Bluepoint	A	None	---	>6.0	---	>60	---	---	---	High	Low.
130*:											
Bracken	B	None	---	>6.0	---	40-60	Soft	---	---	High	High.
Destazo	B	None	---	>6.0	---	>60	---	---	---	High	High.
132 Bracken	B	None	---	>6.0	---	40-60	Soft	---	---	High	High.
133*:											
Bracken	B	None	---	>6.0	---	40-60	Soft	---	---	High	High.
Rock outcrop.											
134 Bracken	B	None	---	>6.0	---	40-60	Soft	---	---	High	High.
1[illegible] Casaga	C	None	---	>6.0	---	>60	---	---	---	High	High.
1[illegible] Cave	D	None	---	>6.0	---	>60	---	4-20	Thick	High	Low.
1[illegible] Cave	D	None	---	>6.0	---	>60	---	10-20	Thick	High	Low.
1[illegible], 1[illegible] Cave	D	None	---	>6.0	---	>60	---	4-20	Thick	High	Low.
1[illegible] Destazo	B	None	---	>6.0	---	>60	---	---	---	High	High.
181*:											
Calza	B	None	---	>6.0	---	>60	---	---	---	High	Low.
Pittman	C	None	---	>6.0	---	>60	---	20-30	Thick	High	Low.

See footnote at end of table.

TABLE 15.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding		High water table		[illegible]		Cemented pan		Risk of corrosion	
		Frequency	Months	Depth	Months	Depth	Thickness	Depth	Hardness	Uncoated steel	Concrete
				Ft		In		In			
182*:											
Caliza	B	None	---	>6.0	---	>60	---	---	---	High	Low.
Pittman	C	None	---	>6.0	---	>60	---	20-30	Thick	High	Low.
Arizo	A	Occasional	Mar-Sep	>6.0	---	>60	---	---	---	High	Low.
183 Caliza	B	None	---	>6.0	---	>60	---	---	---	High	Low.
184 Caliza	B	Rare	---	>6.0	---	>60	---	---	---	High	Low.
187 Caliza	B	None	---	>6.0	---	>60	---	---	---	High	Low.
190 Dalian	B	None	---	>6.0	---	>60	---	---	---	High	Low.
191 Dalian	B	Rare	---	>6.0	---	>60	---	---	---	High	Low.
192*:											
Dalian	B	Rare	---	>6.0	---	>60	---	---	---	High	Low.
McCullough	B	Rare	---	>6.0	---	>60	---	---	---	High	Low.
200 Glencarb	B	Rare	---	>6.0	---	>60	---	---	---	High	Moderate.
206 Glencarb	C	Occasional	Jul-Sep	3.0-5.0	Jul-Jun	>60	---	---	---	High	High.
222 Glencarb	C	Rare	---	3.0-5.0	Jul-Jun	>60	---	---	---	High	High.
236 Glencarb	B	Rare	---	>6.0	---	>60	---	---	---	High	High.
237 Glencarb	B	Rare	---	>6.0	---	>60	---	40-60	Thick	High	Low.
240 Goodsprings	D	None	---	>6.0	---	>60	---	9-20	Thick	High	Low.
252, 255 Grapevine	B	Rare	---	>6.0	---	>60	---	---	---	High	High.
256 Jean	A	Rare	---	>6.0	---	>60	---	---	---	High	Low.
262*:											
Jean	A	Rare	---	>6.0	---	>60	---	---	---	High	Low.
Jean	A	Occasional	Jun-Sep	>6.0	---	>60	---	---	---	High	Low.
Goodsprings	D	Rare	---	>6.0	---	>60	---	9-20	Thick	High	Low.
263*:											
Jean	A	Rare	---	>6.0	---	>60	---	---	---	High	Low.
Jean	A	Occasional	Jun-Sep	>6.0	---	>60	---	---	---	High	Low.
264 Jean	A	Rare	---	>6.0	---	>60	---	---	---	High	Low.

See footnote at end of table.

TABLE 15.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding: Frequency	Flooding: Months	High water table: Depth	High water table: Months	Bedrock: Depth	Bedrock: Thickness	Cemented pan: Depth	Cemented pan: Hardness	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
				Ft		In		In			
[illegible]	B	[illegible]	---	3.5-6.0	Mar-Sep	>60	---	---	---	High	High.
[illegible]	[illegible]	[illegible]	---	1.5-3.0	Jan-Dec	>60	---	---	---	High	High.
[illegible]	[illegible]	[illegible]		3.0-3.5	Jan-Dec	>60	---	---	---	High	High.
[illegible] Vegas	[illegible]	[illegible]	---	>6.0	---	>60	---	3-14	Thick	High	High.
[illegible]*:											
[illegible] Vegas	[illegible]	[illegible]	---	>6.0	---	>60	---	3-14	Thick	High	High.
McCarran	B	Rare	---	>6.0	---	>60	---	---	---	High	High.
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	---	>60	---	---	---	[illegible]	[illegible]
305*:											
Las Vegas	D	Rare	---	>6.0	---	>60	---	3-14	Thick	High	High.
[illegible]	[illegible]	[illegible]	---	>6.0	---	>60	---	---	---	High	High.
307*:											
Las Vegas	D	Rare	---	>6.0	---	>60	---	3-14	Thick	High	High.
Skyhaven	C	Rare	---	>6.0	---	>60	---	24-40	Thick	High	High.
325, 326 McCarran	B	Rare	---	>6.0	---	>60	---	---	---	High	High.
341 Paradise	C	Rare	---	3.0-5.0	Dec-Mar	>60	---	---	---	High	Low.
[illegible]*: [illegible]											
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	---	4-20	Hard	---	---	High	Low.
[illegible] Skyhaven	[illegible]	[illegible]	---	[illegible]	---	>60	---	24-40	Thick	High	High.
390 Spring	C	Rare	---	>6.0	---	>60	---	---	---	High	High.
400 Tencee	D	None	---	>6.0	---	>60	---	7-20	Thick	High	Low.
[illegible]	[illegible]	[illegible]	---	[illegible]	---	>60	---	---	---	High	High.
[illegible]*:											
[illegible]	[illegible]	[illegible]	---	[illegible]	---	>60	---	---	---	High	High.
Rock outcrop.											
418*:											
Aztec	B	None	---	>6.0	---	>60	---	---	---	High	High.
Nickel	B	None	---	>6.0	---	40-60	Hard	---	---	High	Low.
Knob Hill	B	None	---	>6.0	---	>60	---	---	---	High	Low.

See footnote at end of table.

TABLE 15.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding		High water table		Bedrock		Cemented pan		Risk of corrosion	
		Frequency	Months	Depth	Months	Depth	Hardness	Depth	Thickness	Uncoated steel	Concrete
				Ft		In		In			
[illegible]*:											
[illegible]	[illegible]	[illegible]	---	>6.0	---	>60	---	---	---	High	High.
Bracken	B	[illegible]	---	>6.0	---	40-60	Soft	---	---	High	High.
[illegible] [illegible]		[illegible]	---	>6.0	---	>60	---	---	---	High	Low.
[illegible] [illegible]	B	[illegible]	---	>6.0	---	40-60	Hard	---	---	High	Low.
[illegible] [illegible]	[illegible]	[illegible]	---	>6.0	---	>60	---	5-18	Thick	High	High.
481, 484 Hobog	D	None	---	>6.0	---	8-20	Hard	---	---	High	Low.
500*:											
Canutio	B	None	---	>6.0	---	40-60	Hard	---	---	High	Low.
Akela	D	None	---	>6.0	---	10-20	Hard	---	---	High	Low.
501 Canutio	B	None	---	>6.0	---	>60	---	---	---	High	Low.
[illegible]*:											
[illegible]	B	[illegible]	---	>6.0	---	>60	---	---	---	High	Low.
[illegible]		[illegible]	---	>6.0	---	>60	---	4-20	Thick	High	Low.
[illegible]*:											
[illegible]	B	[illegible]	---	>6.0	---	40-60	Hard	---	---	High	Low.
Akela	[illegible]	None	---	>6.0	---	10-20	Hard	---	---	High	Low.
[illegible]*:											
Akela	D	None	---	>6.0	---	10-20	Hard	---	---	High	Low.
Rock outcrop.											
540 Weiser	B	None	---	>6.0	---	>60	---	---	---	High	Low.
[illegible]*:											
[illegible]	[illegible]	[illegible]	---	>6.0	---	>60	---	---	---	High	Low.
[illegible]		[illegible]	---	>6.0	---	>60	---	---	---	High	High.
545*:											
Weiser	B	None	---	>6.0	---	>60	---	---	---	High	Low.
Goodsprings	D	None	---	>6.0	---	>60	---	9-20	Thick	High	[illegible]
600*. Slickens											
605*. Dumps											
610*. Pits											
615*. Urban land											
630*. Badlands											
635*, 640*. Rock outcrop											
645*. Pits											

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--CLASSIFICATION OF THE SOILS

Soil name	Family
Akela	Loamy-skeletal, mixed (calcareous), thermic Lithic Torriorthents
Arizo	Sandy-skeletal, mixed, thermic Typic Torriorthents
Aztec	Loamy-skeletal, mixed, thermic Cambic Gypsiorthids
Bluepoint	Mixed, thermic Typic Torripsamments
Bracken	Coarse-loamy, gypsic, thermic Typic Gypsiorthids
Caliza	Sandy-skeletal, mixed, thermic Typic Calciorthids
Canutio	Loamy-skeletal, mixed (calcareous), thermic Typic Torriorthents
Casaga	Fine-loamy, mixed, thermic Typic Natrargids
Cave	Loamy, mixed, thermic, shallow Typic Paleorthids
Cave Variant	Loamy-skeletal, mixed, thermic, shallow Typic Paleorthids
Dalian	Loamy-skeletal, carbonatic, thermic Typic Torriorthents
Destazo	Loamy-skeletal, carbonatic, thermic Typic Calciorthids
Glencarb	Fine-silty, carbonatic, thermic, Typic Torrifluvents
Goodsprings	Loamy, mixed, thermic, shallow Typic Paleorthids
Grapevine	Coarse-loamy, mixed, thermic Typic Calciorthids
Hobog	Loamy-skeletal, mixed, thermic Lithic Calciorthids
Jean	Sandy-skeletal, mixed, thermic Typic Torriorthents
Knob Hill	Sandy, mixed, thermic Typic Calciorthids
Land	Fine-silty, mixed, thermic Typic Salorthids
Las Vegas	Loamy, carbonatic, thermic, shallow Typic Paleorthids
McCarran	Coarse-loamy, mixed, thermic Cambic Gypsiorthids
McCullough	Coarse-loamy, mixed, thermic Typic Calciorthids
Nickel	Loamy-skeletal, mixed, thermic Typic Calciorthids
Paradise	Coarse-loamy, thermic Typic Calciaquolls
Pittman	Sandy-skeletal, mixed, thermic Typic Paleorthids
Skyhaven	Fine-loamy, carbonatic, thermic Petrocalcic Paleargids
Spring	Fine-silty, mixed, thermic Cambic Gypsiorthids
St. Thomas	Loamy-skeletal, carbonatic, thermic Lithic Torriorthents
Tencee	Loamy-skeletal, carbonatic, thermic, shallow Typic Paleorthids
Weiser	Loamy-skeletal, carbonatic, thermic Typic Calciorthids

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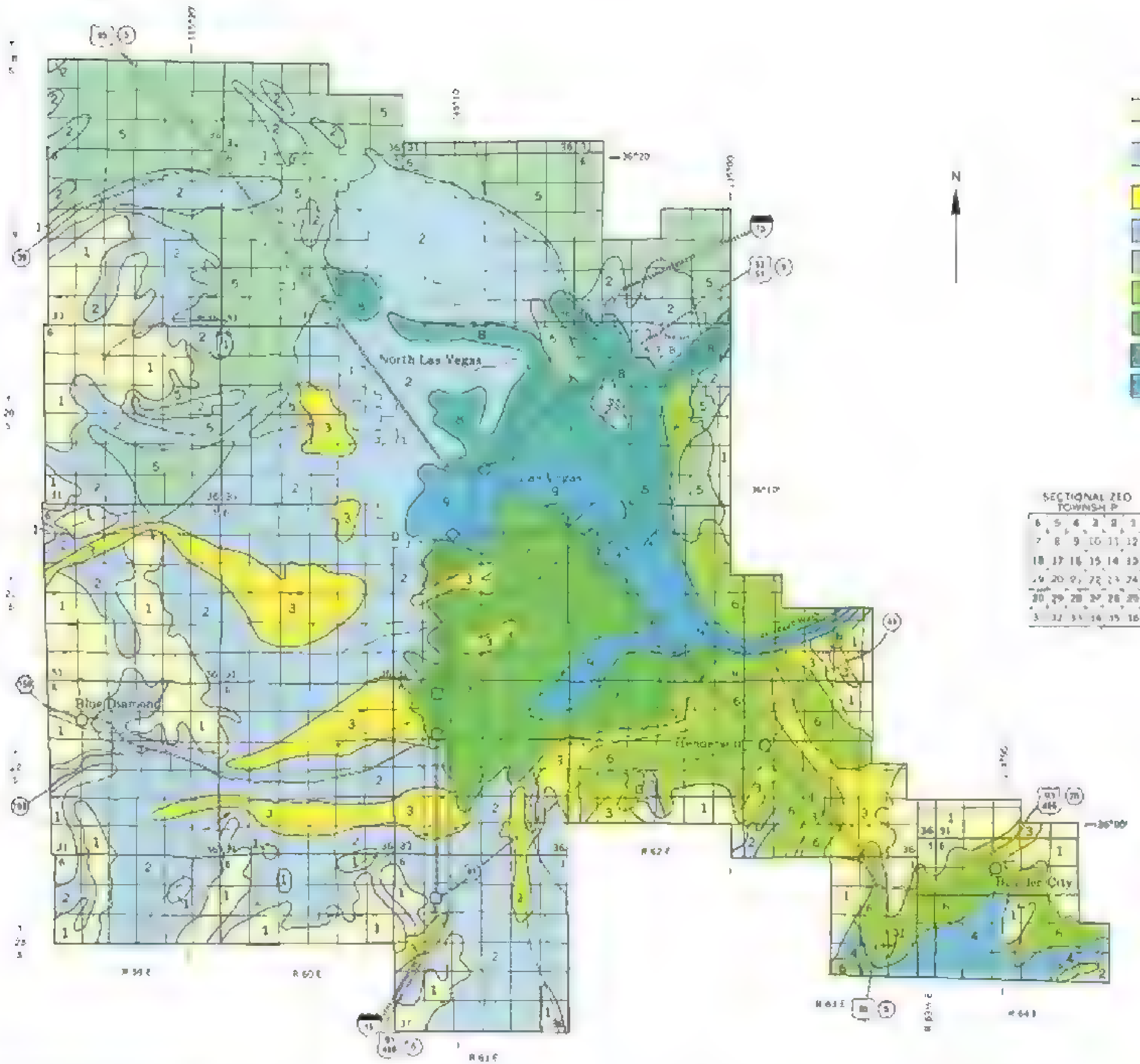


SOIL LEGEND

1	ROCK OUTCROP-ST. THOMAS-AKELA: Rock outcrop and shallow and very shallow soils; on hills and mountains
2	CAVE-LAS VEGAS-GOODSPRINGS: Shallow and very shallow soils; on alluvial remnants
3	JEAN-ARIZO: Very deep soils; on recent alluvial fans
4	BLUEPOINT-KNOB HILL: Very deep soils; on sand sheets
5	WEISER-DALIAN: Very deep soils; on fan remnants, fan skirts, and inset fans
6	CALIZA-AZTEC: Very deep soils; on fan remnants
7	McCARRAN: Very deep soils; on basin floor remnants
8	GLENCARB: Very deep soils; on flood plains and alluvial flats
9	LAND-SPRING: Very deep, salt-affected soils; on alluvial flats

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

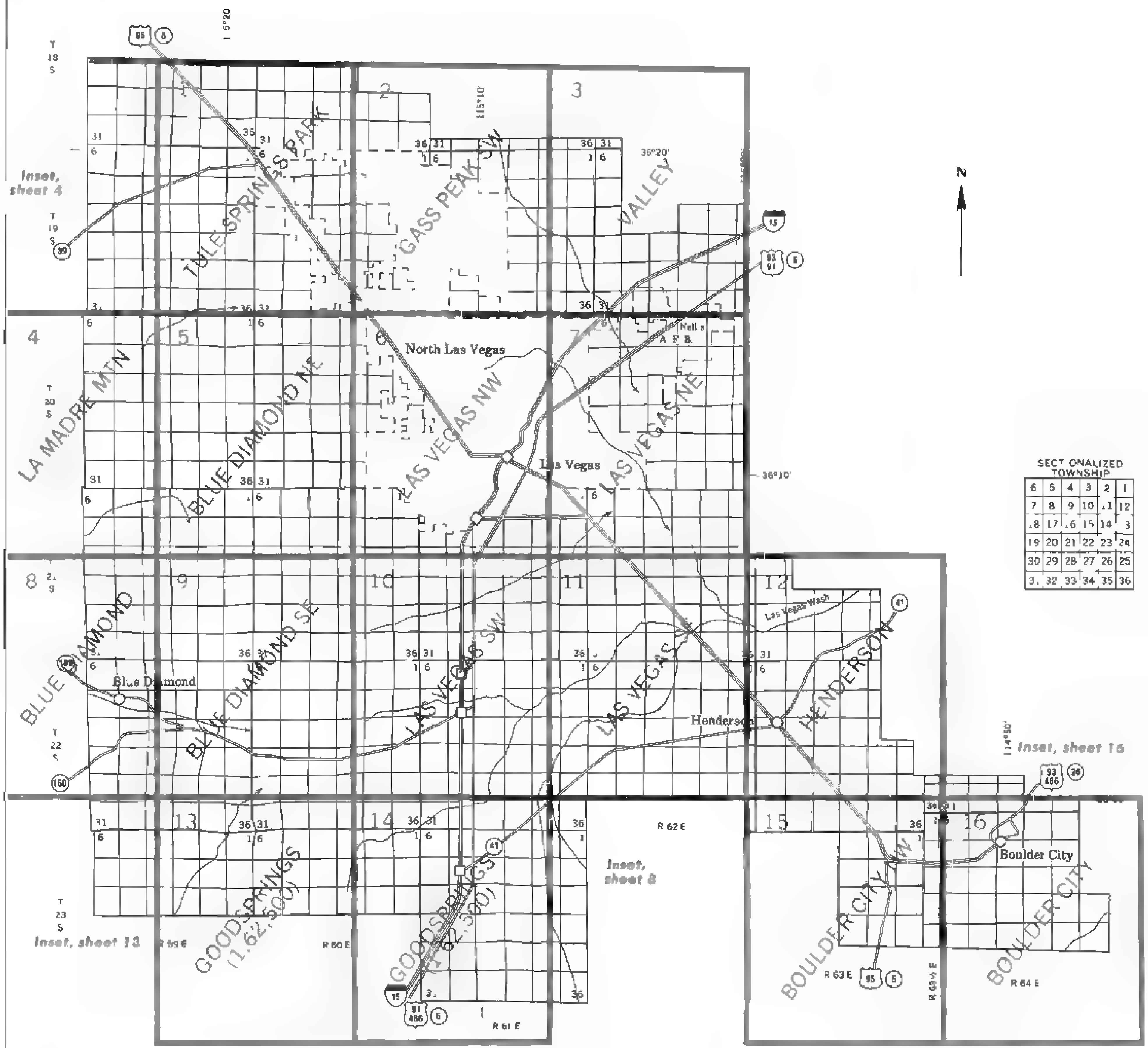
U.S. DEPARTMENT OF INTERIOR
BUREAU OF LAND MANAGEMENT

UNIVERSITY OF NEVADA AGRICULTURAL EXPERIMENT STATION

GENERAL SOIL MAP

LAS VEGAS VALLEY AREA
CLARK COUNTY, NEVADA

Scale 1:253,440



SECTIONALIZED TOWNSHIP

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

INDEX TO MAP SHEETS

LAS VEGAS VALLEY AREA CLARK COUNTY, NEVADA

Scale 1:253 440

1 0 1 2 3 4 Miles

1 0 4 8 Km

SOIL LEGEND

SYMBOL	NAME
106	McCullough-Jean-Bluepoint complex, 0 to 4 percent slopes
107	Arizo extremely stony loam, 0 to 4 percent slopes
112	Arizo very gravelly loamy sand, flooded, 0 to 4 percent slopes
113	Arizo very gravelly fine sandy loam, gypsiferous substratum, 2 to 8 percent slopes
117	Arizo very gravelly fine sandy loam, 2 to 8 percent slopes
120	Bluepoint fine sandy loam, wet, 0 to 2 percent slopes
127	Bluepoint loamy fine sand, 0 to 2 percent slopes
128	Bluepoint gravelly loamy fine sand, 2 to 4 percent slopes
129	Bluepoint loamy fine sand, 4 to 15 percent slopes
130	Bracken-Destazo complex, 2 to 15 percent slopes
132	Bracken very gravelly fine sandy loam, 2 to 8 percent slopes
133	Bracken-Rock outcrop complex, 8 to 30 percent slopes
134	Bracken very gravelly fine sandy loam, 4 to 30 percent slopes
140	Casaga very gravelly sandy clay loam, 0 to 8 percent slopes
150	Cave very stony sandy loam, 0 to 4 percent slopes
151	Cave loamy fine sand, 2 to 8 percent slopes
152	Cave gravelly fine sandy loam, 0 to 4 percent slopes
155	Cave gravelly fine sandy loam, 4 to 15 percent slopes
160	Destazo cobbly fine sandy loam, 0 to 2 percent slopes
181	Caliza-Pittman extremely stony fine sandy loams, 2 to 8 percent slopes
182	Caliza-Pittman-Arizo complex, 0 to 8 percent slopes
[illegible]	Caliza very cobbly loamy sand, 4 to 8 percent slopes
184	Caliza very gravelly sandy loam, 2 to 8 percent slopes
187	Caliza extremely cobbly fine sandy loam, 2 to 8 percent slopes
190	Dalian very gravelly fine sandy loam, 2 to 4 percent slopes
191	Dalian very cobbly fine sandy loam, 2 to 8 percent slopes
192	Dalian-McCullough complex, 0 to 4 percent slopes
200	Glencarb silt loam
208	Glencarb silt loam, flooded
222	Glencarb silty clay loam, wet
[illegible]	Glencarb very fine sandy loam, saline
237	Glencarb very fine sandy loam, hardpan substratum
240	Goodsprings gravelly fine sandy loam, 2 to 4 percent slopes
252	Grapevine very fine sandy loam, 0 to 2 percent slopes
255	Grapevine loamy fine sand, 2 to 4 percent slopes
260	Jean gravelly loamy fine sand, 2 to 4 percent slopes
262	Jean-Goodsprings complex, 2 to 4 percent slopes
[illegible]	Jean complex, 2 to 4 percent slopes
[illegible]	Jean very gravelly loamy fine sand, 2 to 4 percent slopes
270	Land silt loam, drained
278	Land very fine sandy loam, wet
[illegible]	Land silty clay loam
300	Las Vegas gravelly fine sandy loam, 0 to 2 percent slopes
301	Las Vegas gravelly fine sandy loam, 2 to 4 percent slopes
302	Las Vegas-McCarran-Grapevine complex, 0 to 4 percent slopes
305	Las Vegas-Destazo complex, 0 to 2 percent slopes
307	Las Vegas-Skyhaven complex, 0 to 4 percent slopes
325	McCarran fine sandy loam, 0 to 4 percent slopes
326	McCarran very cobbly fine sandy loam, 2 to 8 percent slopes
34	Paradise silt loam
360	Rock outcrop-St Thomas complex, 15 to 30 percent slopes
380	Skyhaven very fine sandy loam, 0 to 4 percent slopes
390	Spring clay loam
400	Tencee very gravelly fine sandy loam, 2 to 8 percent slopes
4 6	Aztec very gravelly sandy loam, 2 to 8 percent slopes
417	Aztec-Rock outcrop complex, 8 to 30 percent slopes
4 8	Aztec-Nickel-Knob Hill complex, 2 to 5 percent slopes
419	Aztec-Bracken complex, 4 to 30 percent slopes
430	Knob Hill loamy sand, 0 to 4 percent slopes
440	Nickel very gravelly fine sandy loam, bedrock substratum, 4 to 8 percent slopes
450	Cave Variant very cobbly very fine sandy loam, 4 to 30 percent slopes
481	Hobog loamy fine sand, 5 to 50 percent slopes
484	Hobog very cobbly fine sandy loam, 15 to 50 percent slopes
500	Canutio-Akela complex, 2 to 15 percent slopes
501	Canutio gravelly fine sandy loam, 0 to 2 percent slopes
502	Canutio-Cave gravelly fine sandy loams, 2 to 8 percent slopes
505	Canutio-Akela complex, 15 to 50 percent slopes
510	Akela-Rock outcrop complex, 15 to 50 percent slopes
540	Weiser extremely gravelly fine sandy loam, 2 to 8 percent slopes
542	Weiser-Aztec complex, 2 to 8 percent slopes
545	Weiser-Goodsprings complex, 2 to 4 percent slopes
600	Slickens
606	Dumps
610	Pits, gravel
616	Urban land
630	Badland
635	Rock outcrop, limestone
640	Rock outcrop, sandstone
646	Pits, quarry

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

CULTURAL FEATURES

BOUNDARIES

- National, state or province
- County or parish
- Minor civil division
- Reservation (national forest or park, state forest or park, and large airport)
- Land grant
- Limit of soil survey (label)
- Field sheet matchline & neatline

AD HOC BOUNDARY (label)

- Small airport, airfield, park, oilfield, cemetery, or flood pool

STATE COORDINATE TICK

LAND DIVISION CORNERS (sections and land grants)

ROADS

- Divided (median shown if scale permits)
- Other roads
- Trail

ROAD EMBLEM & DESIGNATIONS

- Interstate
- Federal
- State
- County, farm or ranch

RAILROAD

POWER TRANSMISSION LINE (normally not shown)

PIPE LINE (normally not shown)

FENCE (normally not shown)

LEVEES

- Without road
- With road
- With railroad

DAMS

- Large (to scale)
- Medium or small — water

PITS

- Gravel pit
- Mine or quarry

MISCELLANEOUS CULTURAL FEATURES

- Farmstead, house (omit in urban areas)
- Church
- School
- Indian mound (label) — Indian Mound
- Located object (label) — Tower
- Tank (label) — Gas
- Wells, oil or gas
- Windmill
- Kitchen midden

WATER FEATURES

DRAINAGE

- Perennial, double line
- Perennial, single line
- Intermittent
- Drainage end
- Canals or ditches
  - Double-line (label) — CANAL
  - Drainage and/or irrigation

LAKES, PONDS AND RESERVOIRS

- Perennial — water
- Intermittent — int

MISCELLANEOUS WATER FEATURES

- Marsh or swamp
- Spring
- Well, artesian
- Well, irrigation
- Wet spot

SPECIAL SYMBOLS FOR SOIL SURVEY

SOIL DELINEATIONS AND SYMBOLS — CnB WaC2

ESCARPMENTS

- Bedrock (points down slope)
- Other than bedrock (points down slope)

SHORT STEEP SLOPE

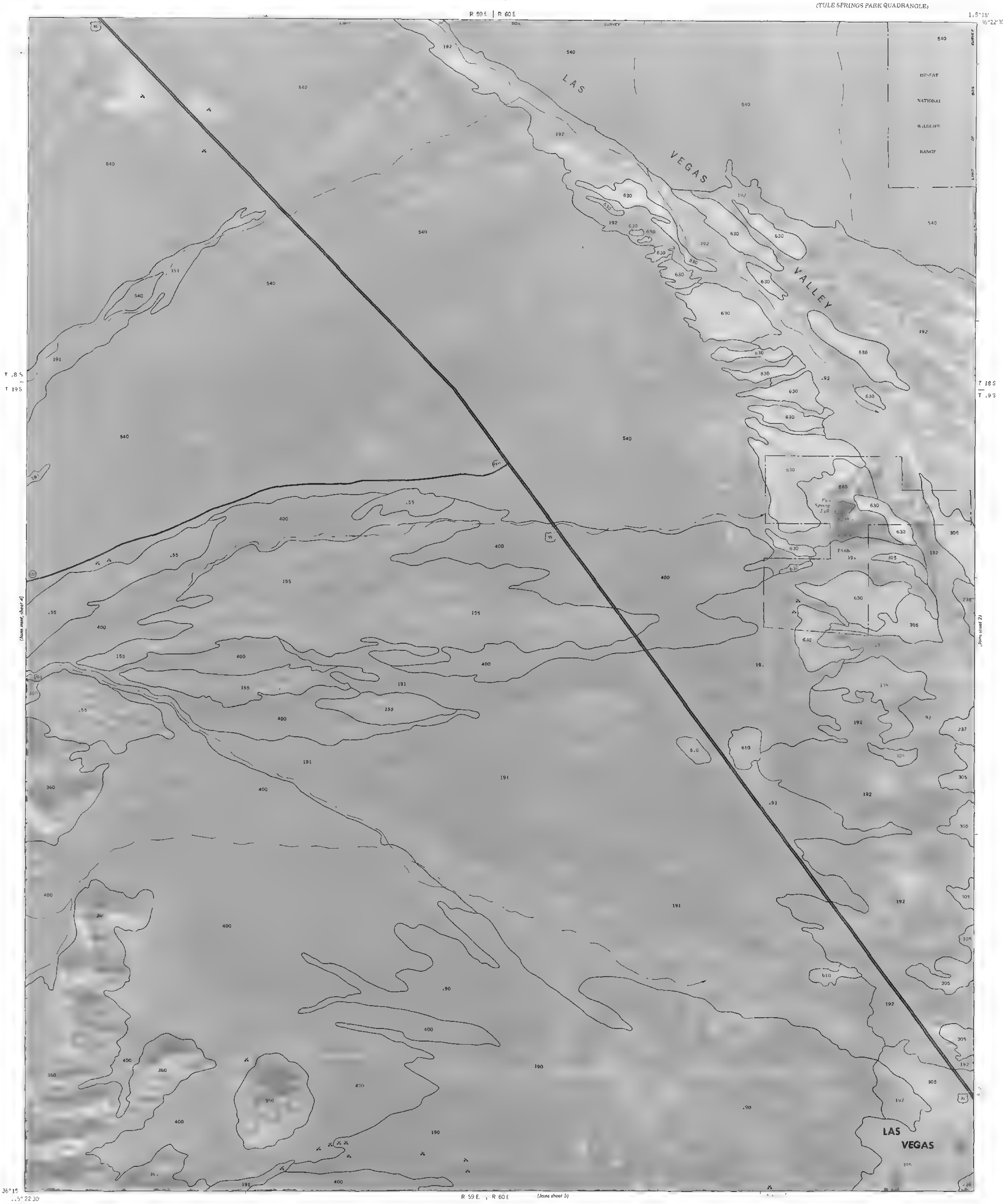
GULLY

DEPRESSION OR SINK

SOIL SAMPLE SITE (normally not shown)

MISCELLANEOUS

- Blowout
- Clay spot
- Gravelly spot
- Gumbo, slick or scabby spot (sodic)
- Dumps and other similar non soil areas (less than 5 acres)
- Prominent hill or peak
- Rock outcrop (less than 2 acres) (includes sandstone and shale)
- Saline spot
- Sandy spot
- Severely eroded spot
- Slide or slip (tips point upslope)
- Stony spot, very stony spot
- Borrow pit (less than 5 acres)
- Gypsum rock outcrop (less than 5 acres)



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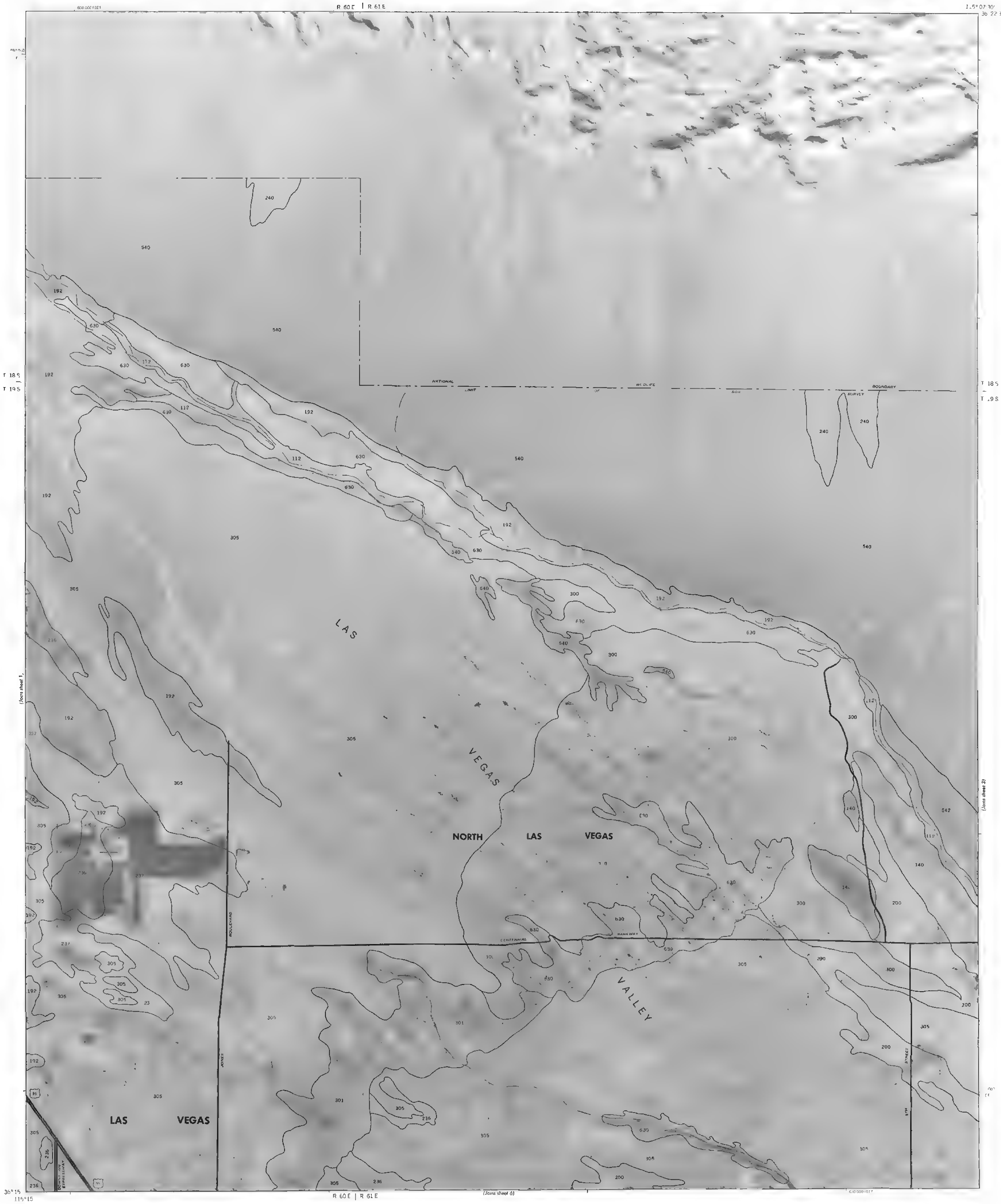
SCALE 1 24 000

LAS VEGAS VALLEY AREA, NEVADA NO 1

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SHEET NO. 2
SOIL SURVEY OF LAS VEGAS VALLEY AREA, NEVADA
PART OF CLARK COUNTY
(GASS PEAK SW QUADRANGLE)



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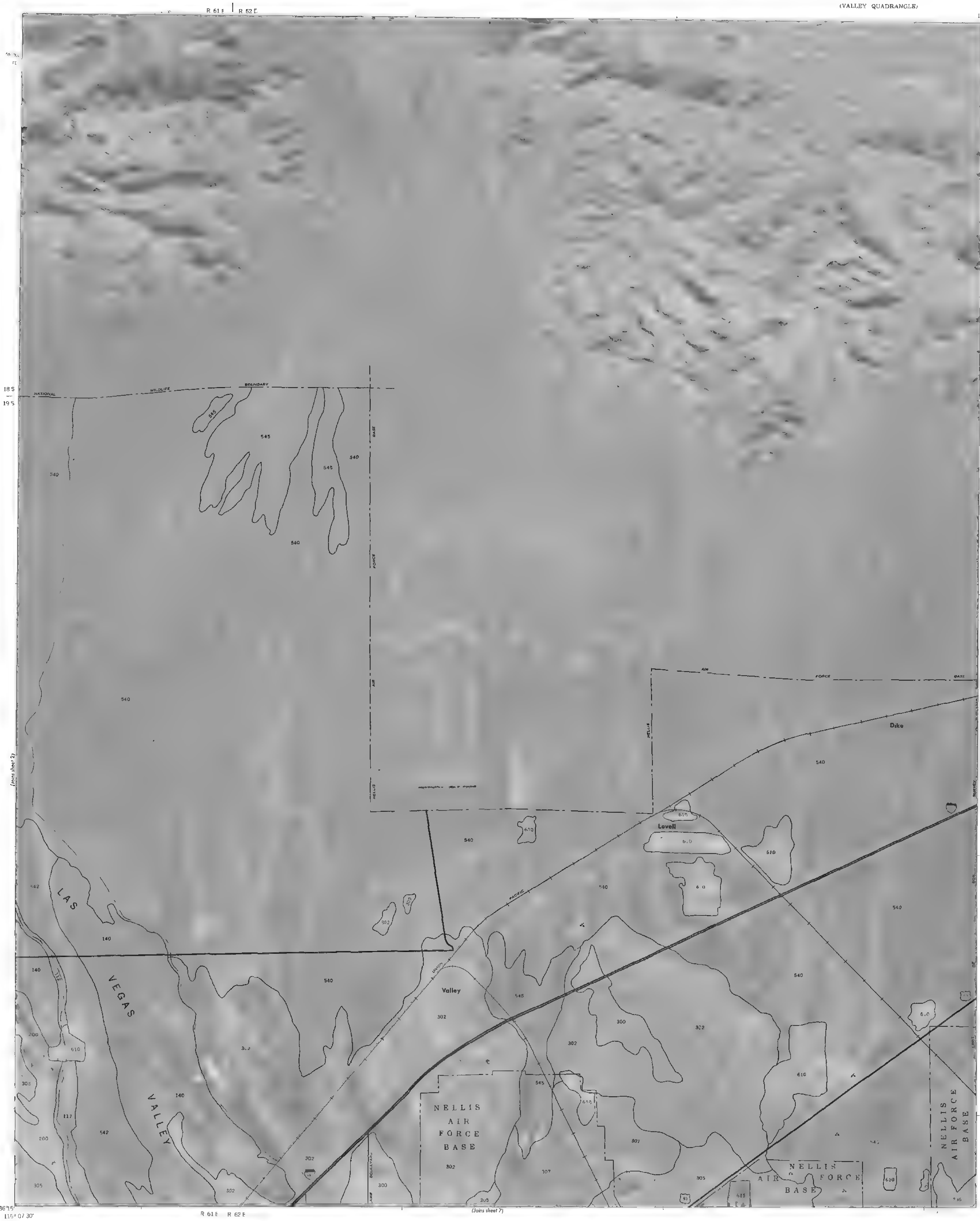
1 3/4 1/2 1/4 0 1 2 MILES
1 0.5 0 1 2 KILOMETERS
SCALE 1:24 000

LAS VEGAS VALLEY AREA, NEVADA NO. 2

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SHEET NO 3
SOIL SURVEY OF LAS VEGAS VALLEY AREA, NEVADA,
PART OF CLARK COUNTY
(VALLEY QUADRANGLE)



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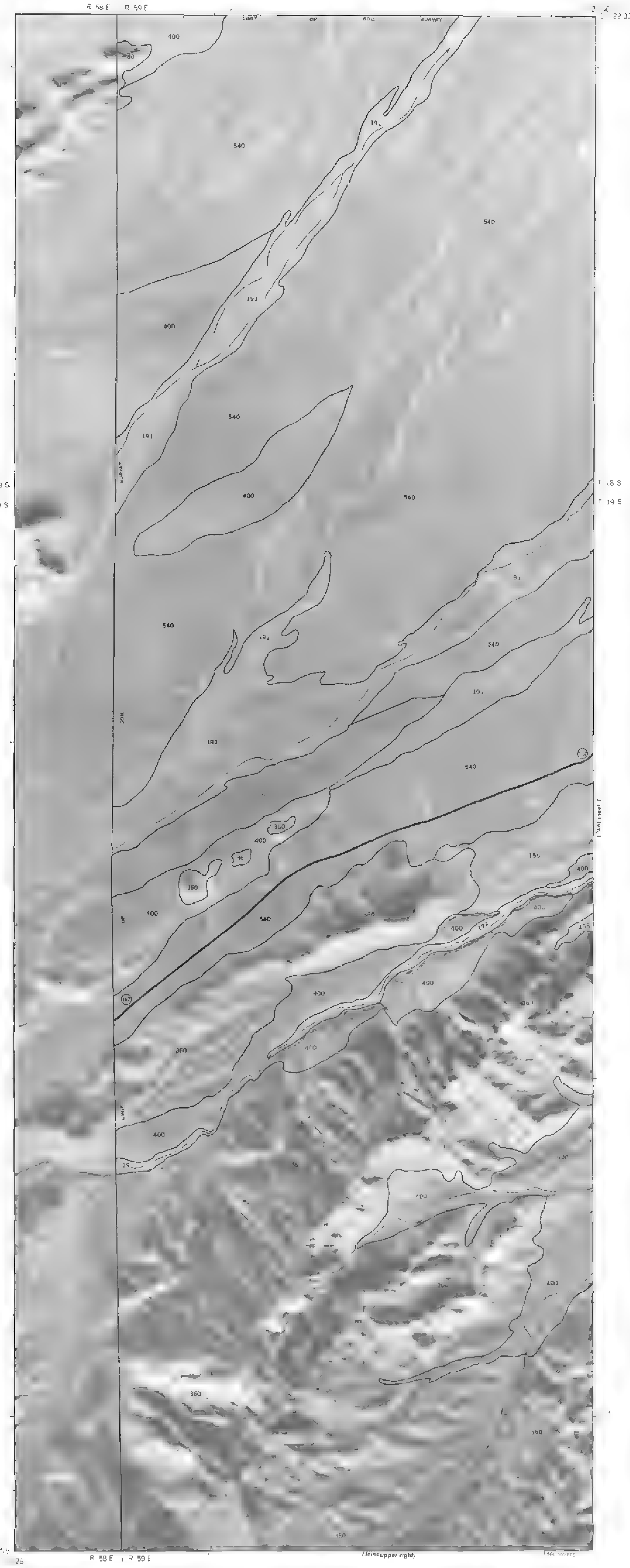
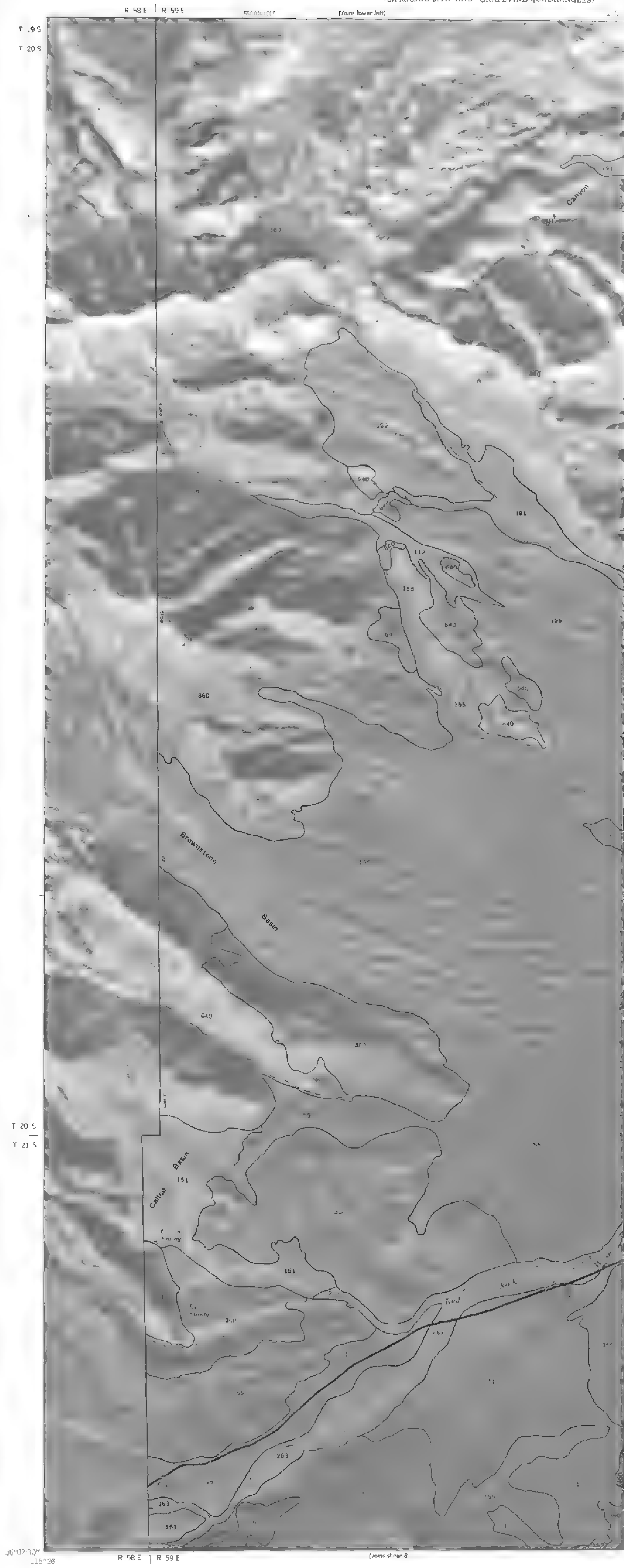
SCALE 1:24 000
2 MILES
2 KILOMETERS

LAS VEGAS VALLEY AREA, NEVADA NO. 3





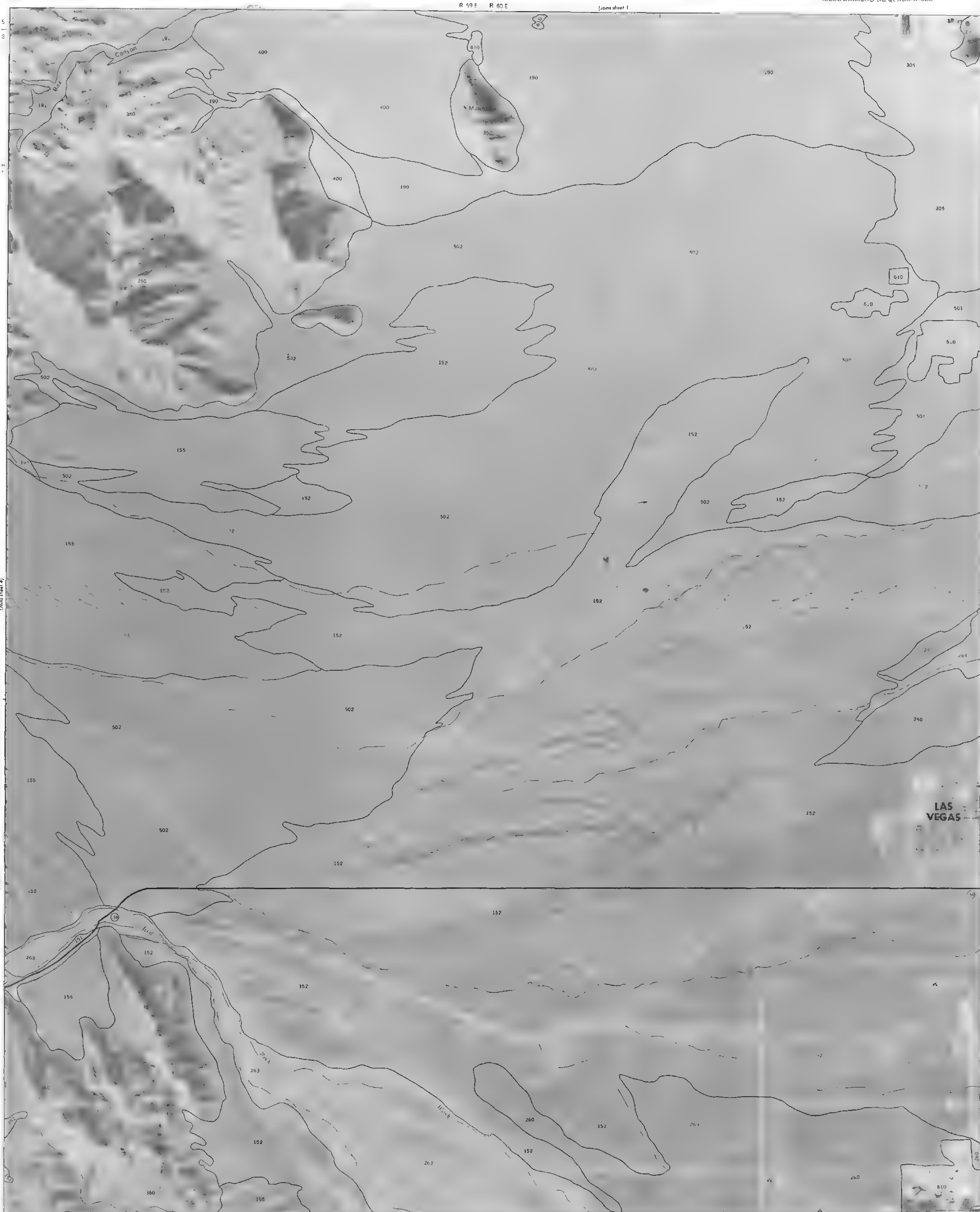
SCALE 1:24 000

2 MILES

2 KILOMETERS

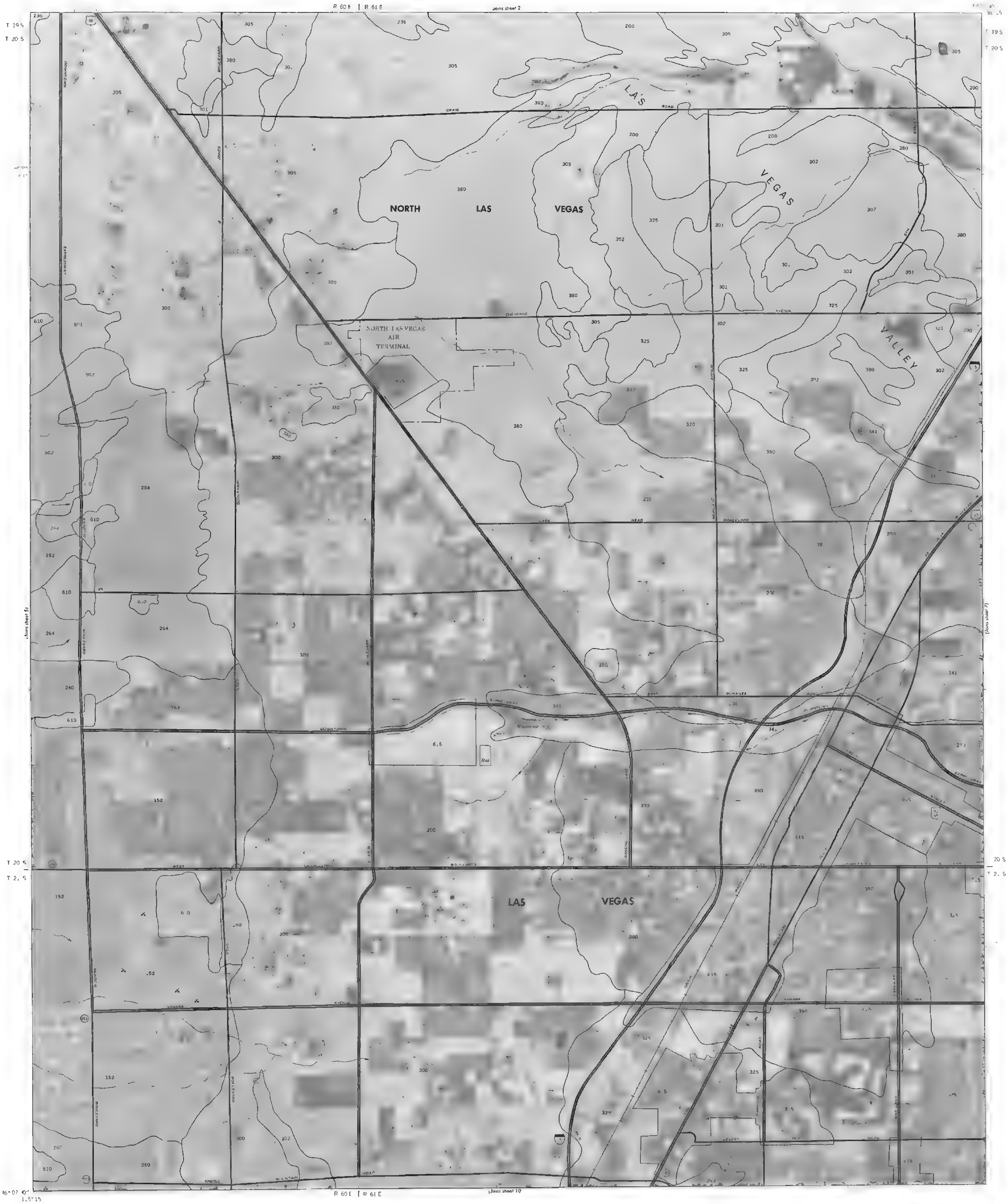
U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL SURVEY OF LAS VEGAS VALLEY AREA, NEVADA
PART OF CLARK COUNTY
(BLUE DIAMOND NE QUADRANGLE)



This soil survey map was compiled by the U.S. Department of Agriculture Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of the Interior, Geological Survey ... and 1977 aerial photography. Coordinate grid ticks and ... shown are approximately positioned.

3/4 1/2 1/4 0 1 2 MILES
0 1 2 KILOMETERS
SCALE 1:24 000



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SCALE 1:24 000

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SHEET NO. 7
SOIL SURVEY OF LAS VEGAS VALLEY AREA, NEVADA
PART OF CLARK COUNTY
(LAS VEGAS NE QUADRANGLE)

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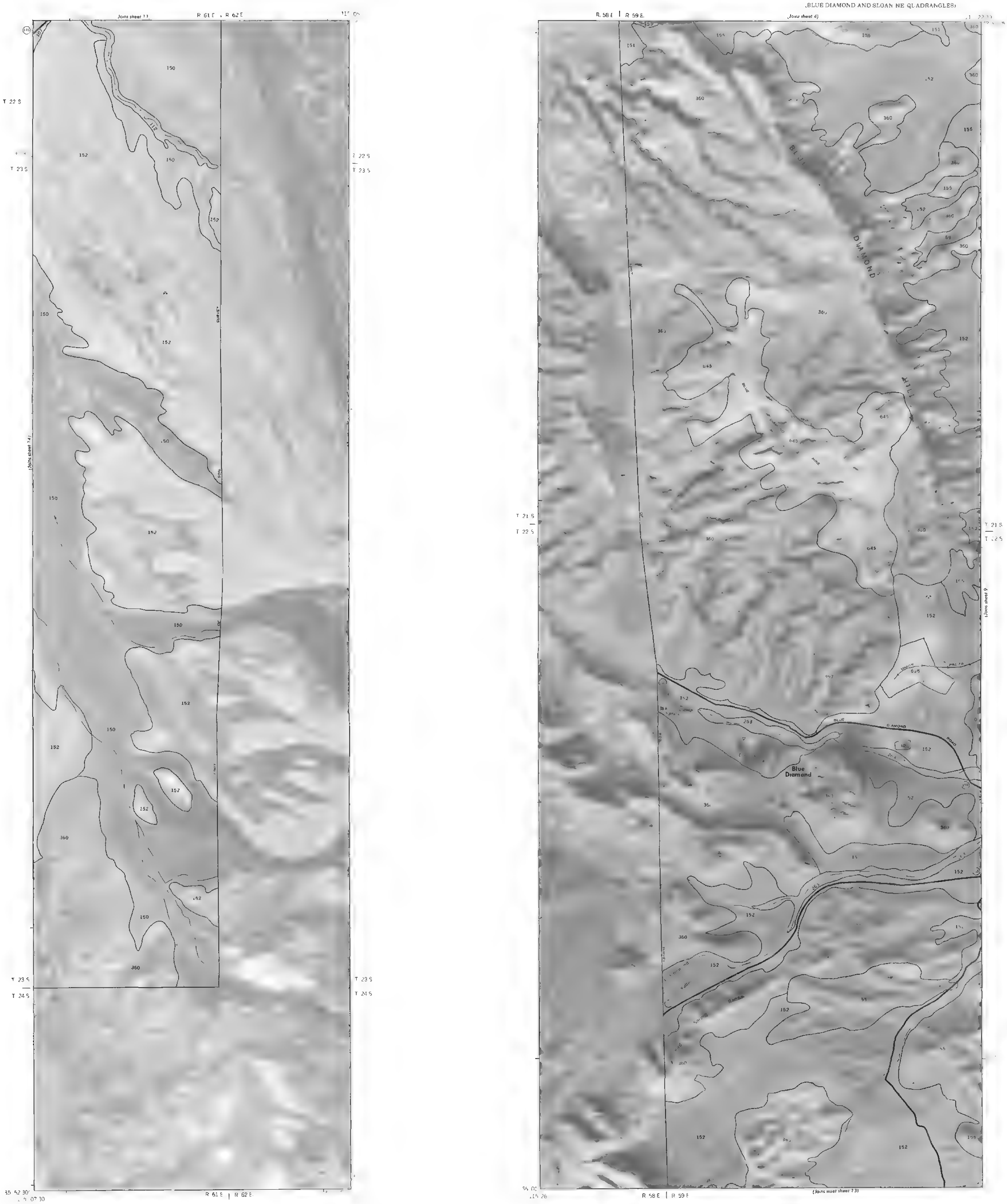
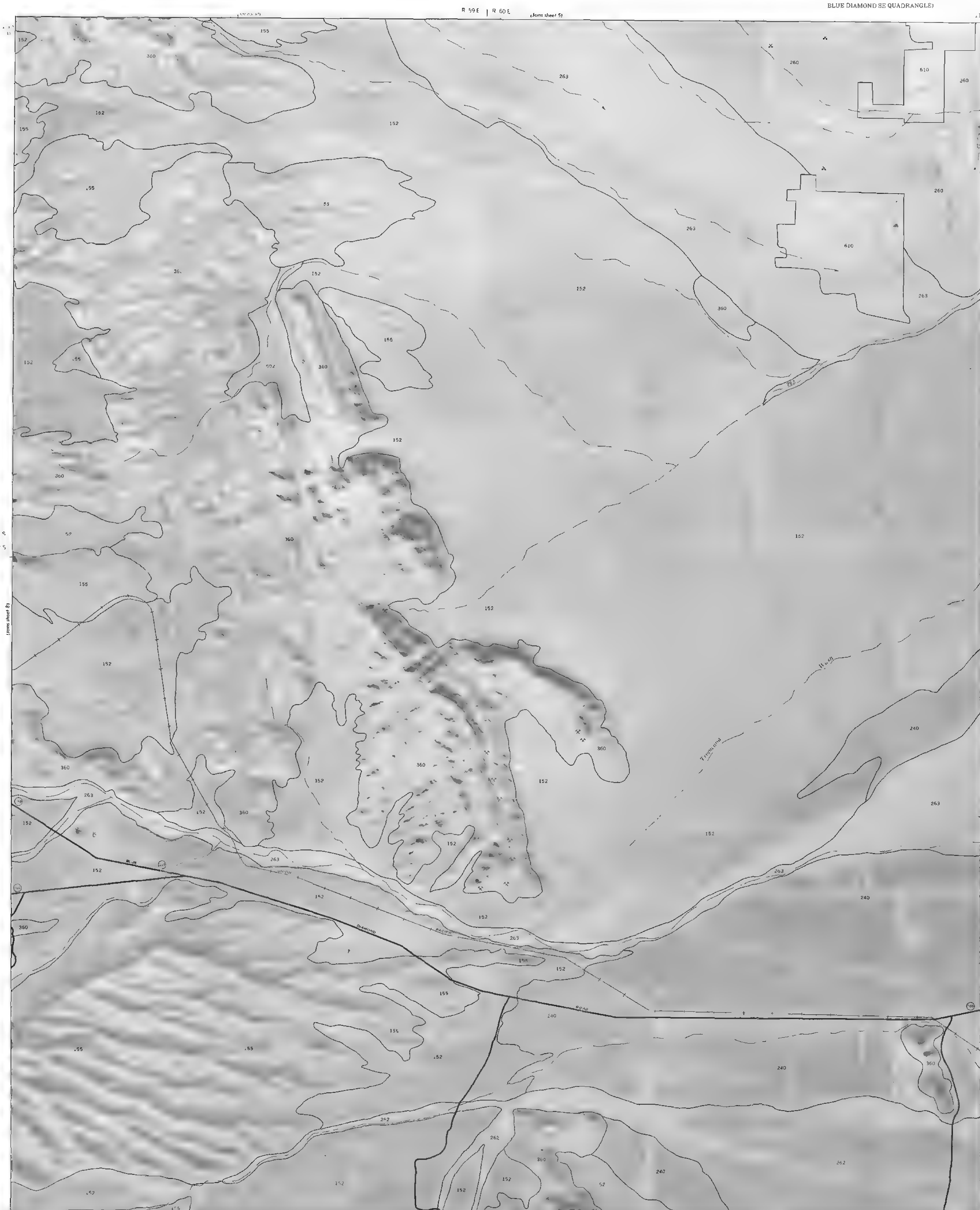
SCALE 1:24 000

LAS VEGAS VALLEY AREA, NEVADA NO. 7



This soil survey map was compiled by the U.S. Department of Agriculture ... Base maps are ... by the U. S. Department of the Interior, Geological Survey ... aerial photography. Coordinate grid ticks and ... are approximately positioned

SCALE 1:24 000
1 MILES
2 KILOMETERS



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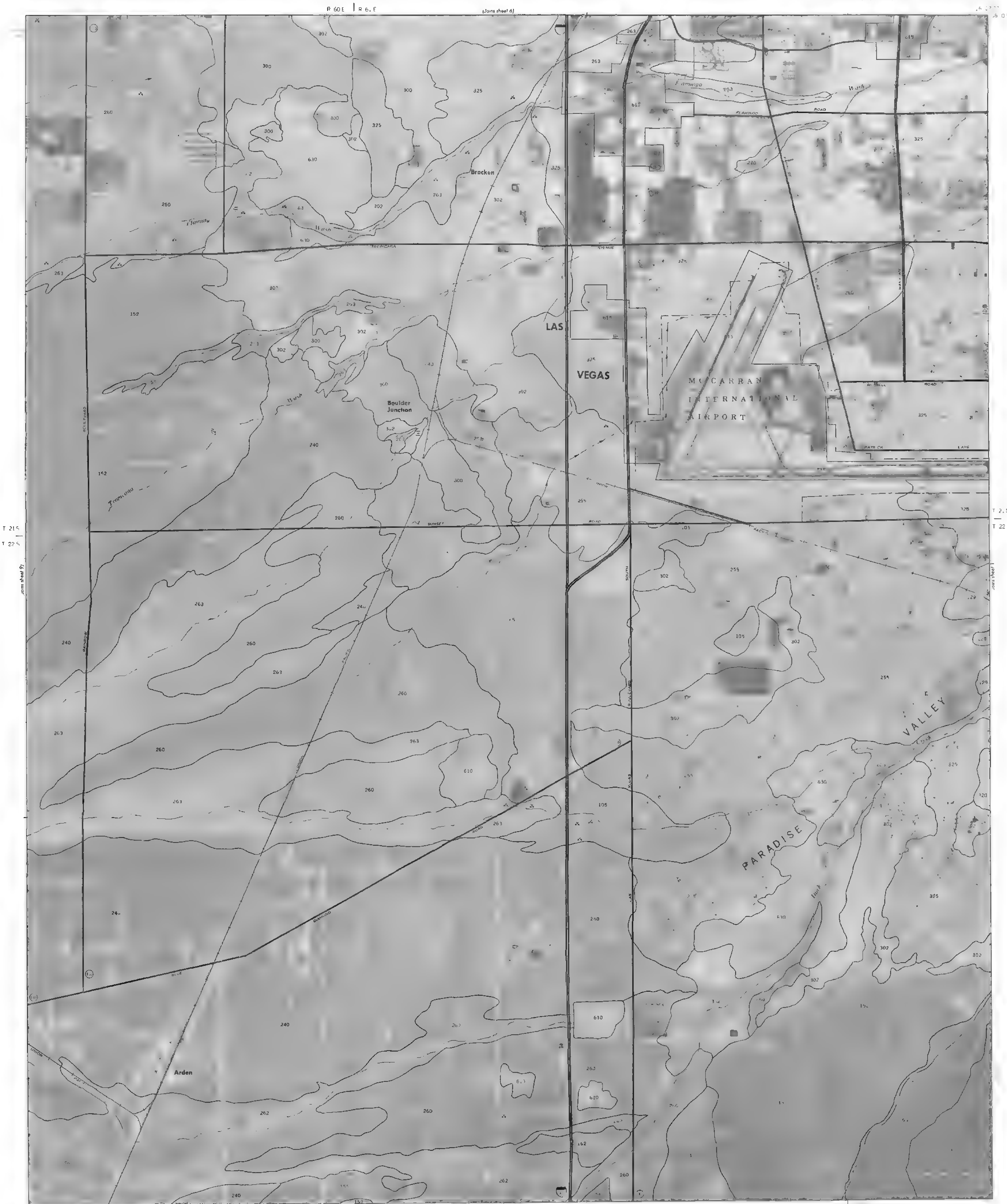
1 3/4 1/2 1/4 0 1 2 MILES
1 0.5 0 1 2 KILOMETERS
SCALE 1:24 000

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL SURVEY OF LAS VEGAS VALLEY AREA, NEVADA
PART OF CLARK COUNTY
LAS VEGAS SW QUADRANGLE

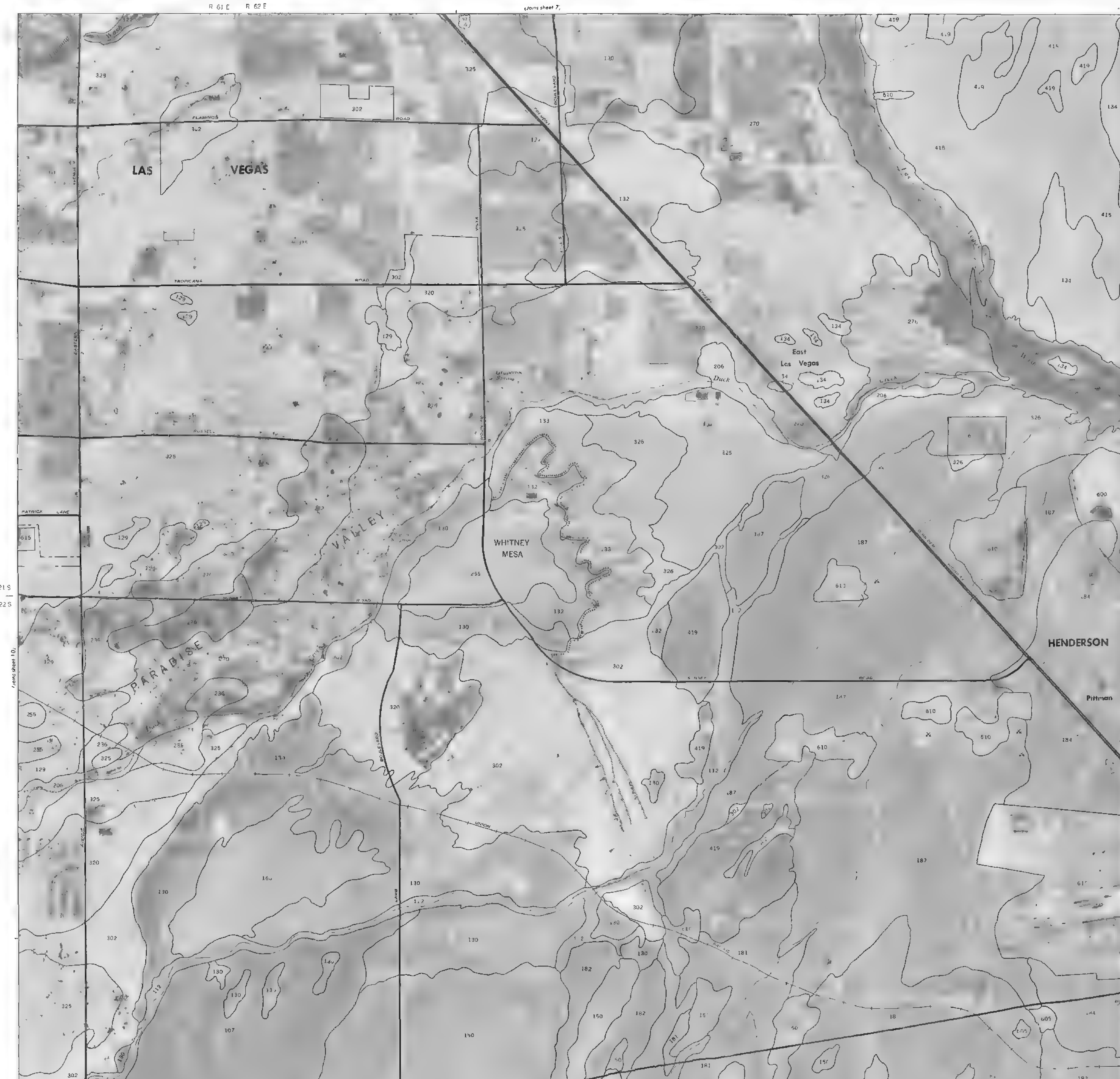


...survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are ...prepared by the U.S. Department of the Interior, Geological ... aerial photography. Coordinate grid ticks and land division corners ...own are approximately positioned.

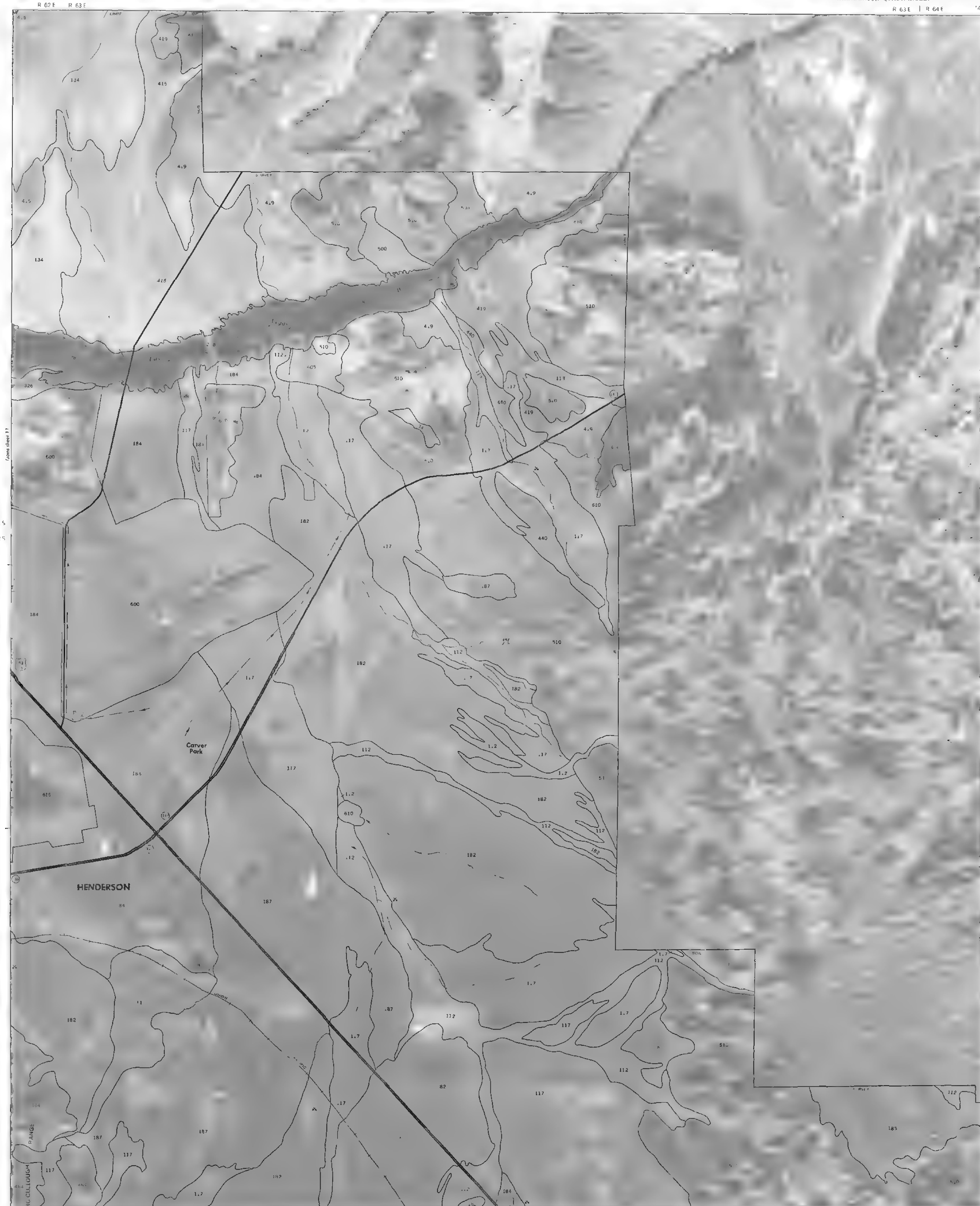
SCALE 1:24 000

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SHEET NO. 11
SOIL SURVEY OF LAS VEGAS VALLEY AREA, NEVADA
PART OF CLARK COUNTY
LAS VEGAS SE QUADRANGLE



SCALE 1:24 000



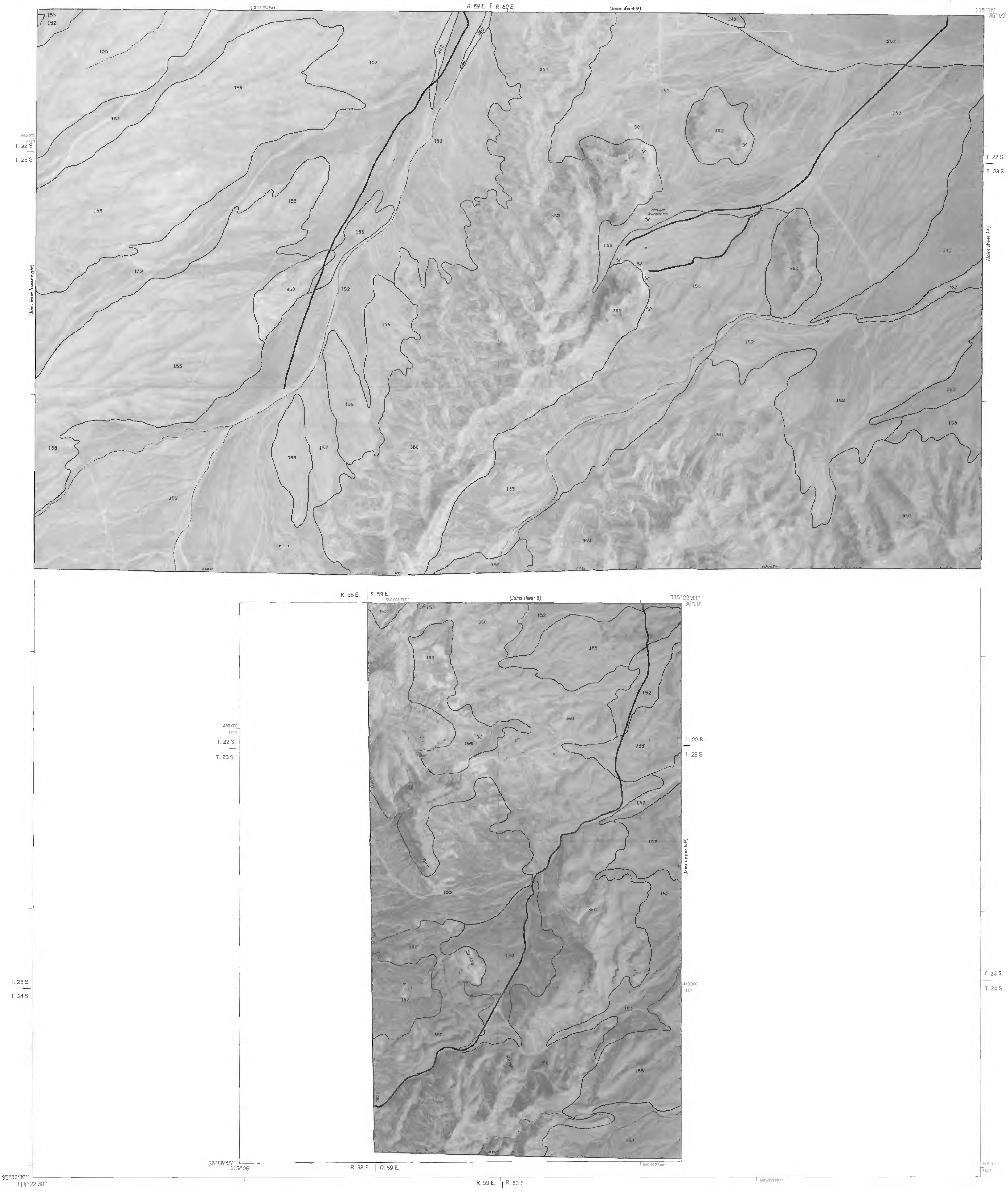
SCALE 1:24 000

1 MILE 0 2 MILES

1 0 2 KILOMETERS

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL SURVEY OF LAS VEGAS VALLEY AREA, NEVADA
PART OF CLARK COUNTY
(GOODSPRINGS NE AND NW QUADRANGLES)



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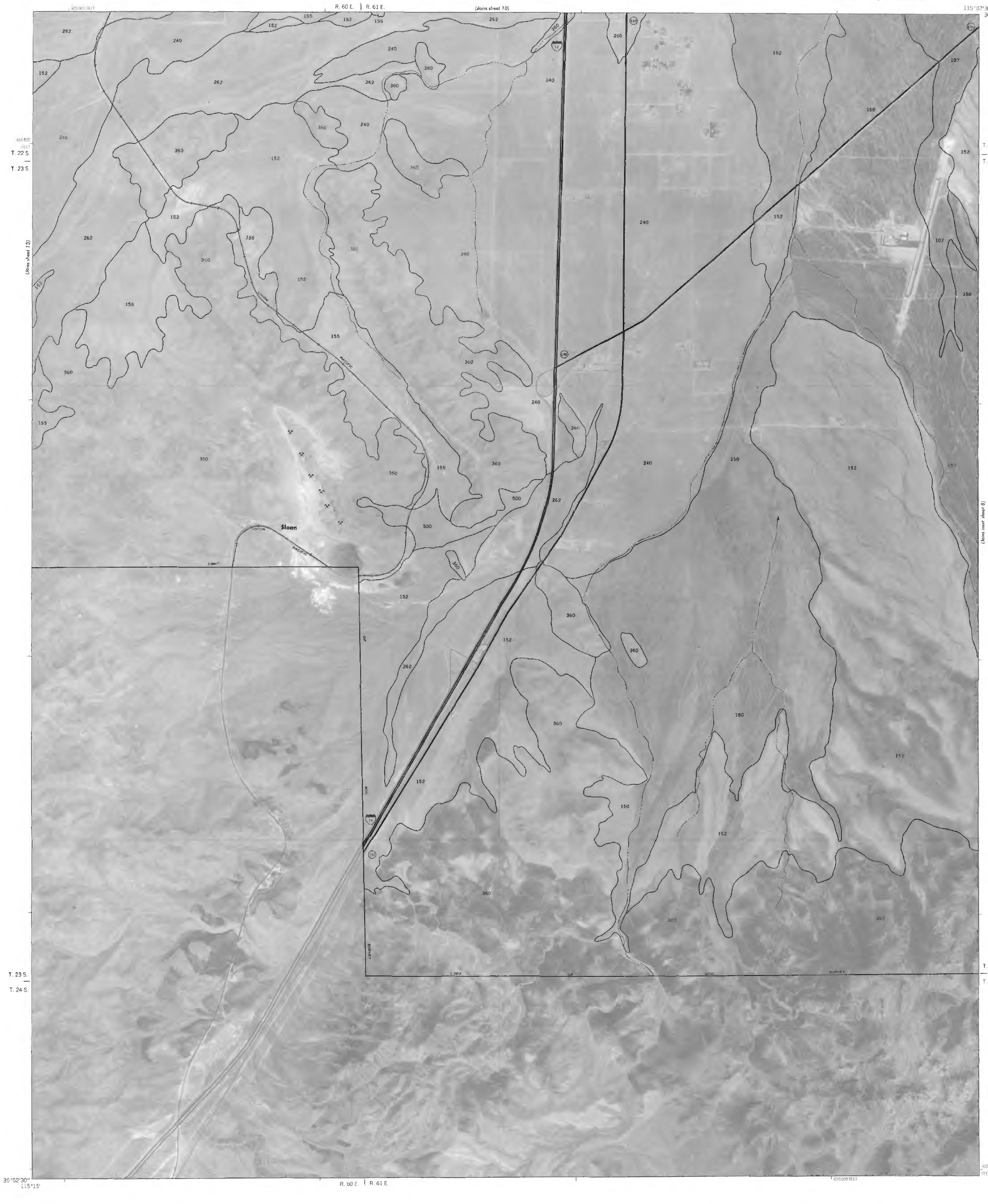
1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000



SCALE 1:24 000

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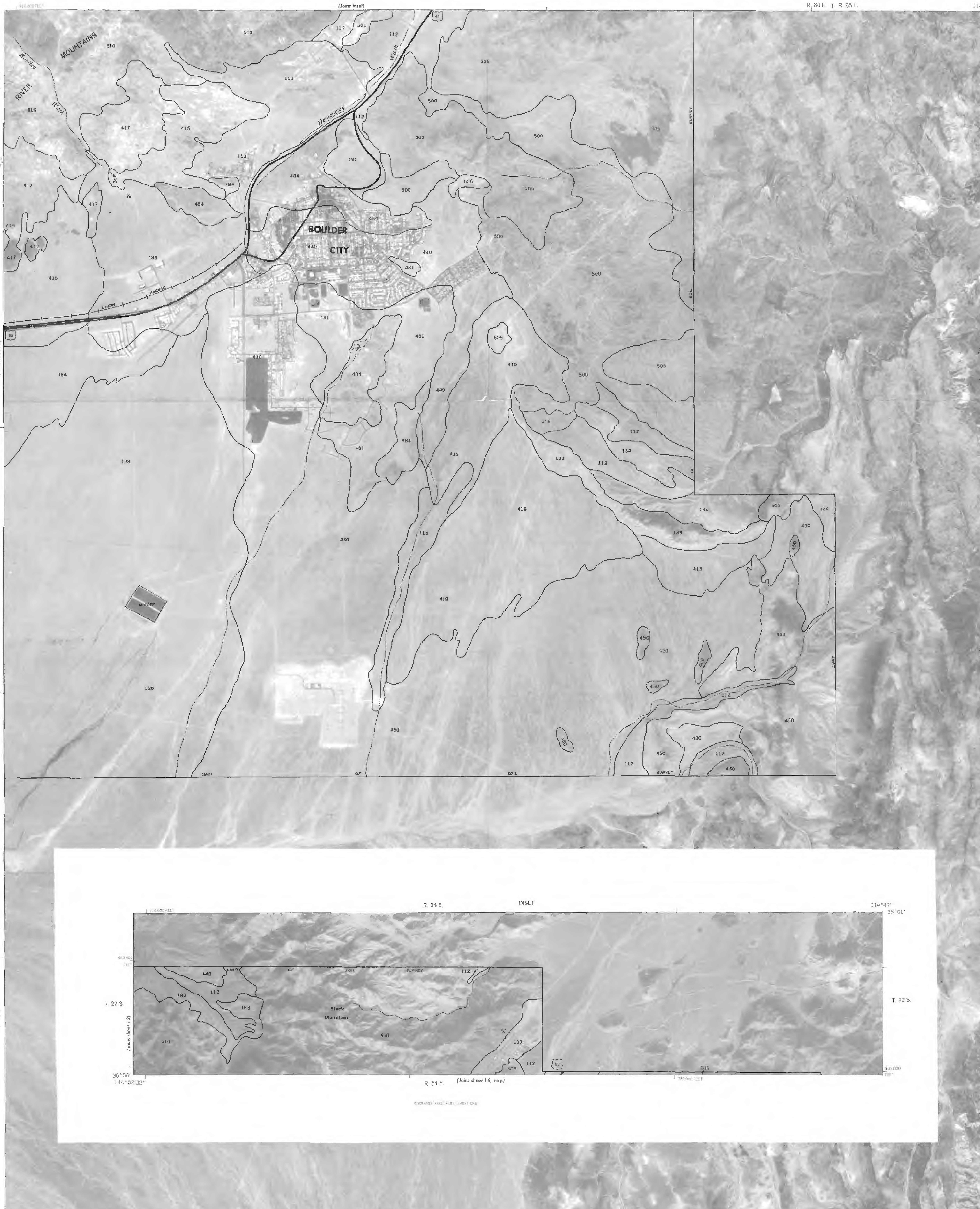
1 3/4 1/2 1/4 0 1 2 MILES
1 0.5 0 1 2 KILOMETERS
SCALE 1:24 000

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SHEET NO. 16
SOIL SURVEY OF LAS VEGAS VALLEY AREA, NEVADA
PART OF CLARK COUNTY
(BOULDER CITY AND BOULDER BEACH QUADRANGLES)



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1 3/4 1/2 1/4 0 1 2 MILES
1 0.5 0 1 2 KILOMETERS
SCALE 1:24 000